RAILROAD GAZETTE

FRIDAY, DECEMBER 15, 1899.

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Contributions.

The Theory of Velocity Grades.

To the Editor of the Railroad Gazette:

In the article on "The Theory of Velocity Grades" in your issue of Dec. 8, p. 837, there is given an empirical formula $P = \frac{4\,D}{S + 10}$, where P = traction of engine at rails in pounds, D = wt. of engine on drivers in pounds, and S = speed in miles per hour. The assumption made here is at variance with the ordinary practice of considering that the adhesion is the measure of the traction and that the adhesion is independent of the velocity. In the brake experiments made by Galton (in connection with Westinghouse) the coefficient of adhesion of car wheels was found to be independent of the velocity of the car. From the experiments of Prof. Goss on the effect of incorrect counterbalancing of locomotive wheels, it seems possible that for locomotive wheels some decrease of coefficient may result from an increase of speed. At moderate speeds, the experiments indicate that the effect could hardly be important, and it is not readily conceivable that the coefficient of adhesion should from this cause vary from ¼ at 6 miles an hour to ⅓ at 18 miles an hour. It is difficult to understand how the "personal equation of the engineer and fireman, and the coal used," can seriously affect this in connection with velocity grades.

The personal equation of the Superintendent of Motive Power ougnt to be expected to enter into the matter to an extent to make the personal equation of the engineer and fireman small enough to be properly neglected. It is considered good locomotive practice to make the boiler power and the cylinder power of a locomotive at least equal to the adhesion. Where this has been done, the engineer and fireman who regularly stall their train without slipping the drivers will become the victims of the personal equation of the Superintendent of Motive Power, and cease to be disturbing factors in the operation of the velocity grade.

The practice of the Master Mechanics' Association appears in 1887 to be to take the coefficient of adhesion for freight trains at $\frac{1}{4.25}$. The formula $P = \frac{4\,D}{S + 10}$ gives for a speed of 18 miles an hour a coefficient of ¼, With a locomotive of 45 tons on drivers, the traction in one case is 21,176 lbs. and in the other 12,857, a difference of 8,319 lbs. If train resistance on the level be taken as 6 lbs. per ton, then on a grade of 1.00 per 100 the total resistance will be 26 lbs. per ton and 8,319 lbs. measures the resistance of about 320 tons. If it should cost (for a conservative estimate) only 1 mill extra per ton-mile to haul these 320 tons on other trains, this would amount to 32 cents more per train mile; on a division of 100 miles there would be a difference of $32 per train. Rather than allow a leak of this amount in the operation of the road, the most urgent measures could be resorted to both in the design of locomotive and in checking the work of engineer and fireman. An inspector on each train to prevent this waste would prove a source of rare economy. Before the empirical formula $P = \frac{4\,D}{S + 10}$ is accepted, data in considerable detail should be offered to demonstrate its substantial accuracy, as it appears to be opposed to ordinary practice, and unreasonable in its results.

Another point of far less importance, is in formula I, where ⅔ is used as a coefficient before $(S_1^2 - S_2^2)$. This coefficient appears to neglect to take into account the rotative energy of the car wheels, and is thus in error by 4⅓ to 6¼ per cent. depending upon whether the practice of the Baldwin Locomotive Works is adopted or the figures of Wellington's Economic Theory of Railway Location are taken. The difference would not be important for freight train speeds. A coefficient of ½ would nearly agree with both Wellington and the Baldwin Locomotive Works.

KICKER.

Black Prints.

Philadelphia, December 9, 1899.

To the Editor of the Railroad Gazette:

In the Railroad Gazette of this date Mr. Herman Esser makes a statement to the effect that "there are at present three different processes in actual use for copying drawings by the aid of the sunlight," viz., the blue process, giving white lines on a blue ground; the nigrosine or positive black process, giving neat black lines on a white ground; and the maduro or brown process, giving white lines on a dark-brown ground. The author states that "all other processes are either too cumbersome in their manipulation, or need dark rooms and other appliances, so that they cannot come into general use with architects, engineers and draftsmen."

Mr. Esser is evidently unaware of the existence of my black line positive process, samples of which I send you under separate cover, which needs no dark room, which requires less time than either of the three processes named by Mr. Esser, and which can readily be learned and operated by any fairly intelligent boy.

As you are doubtless familiar with the results of the nigrosine process, you will at once recognize the superiority of the prints which I now send you, as to blackness of line, whiteness of ground, and character of paper. Owing to the necessary sizing of the nigrosine paper, I am compelled to dissent from Mr. Esser's statement that "nigrosine prints can be colored, shaded, altered, etc., just like an original drawing"; whereas, you can readily satisfy yourself, by trial, that this holds good respecting my prints.

I must also take exception to Mr. Esser's statement of the time required for the several operations of the nigrosine process, viz., exposure, 3 to 5 minutes; developing, 1 to 2 minutes; water bath, about 30 minutes. My experience gives results about as follows as the time in minutes required:

	Nigrosine process.	LeClere process.
Exposure	10 to 20	½ to 1¼
Developing	2 to 10	10 to 15
Bath	30 to 60	1 to 2
Total	42 to 90	12 to 20

FRANCIS LE CLÈRE.

Pooling of Locomotives.*

The pool with which I am familiar includes both freight and passenger runs, and is by no means an experiment, having been in successful operation since August, 1893. In it there are used eight-wheel, ten-wheel, mogul and consolidation locomotives. There are also fast trains, slow trains, work and local trains, and all these runs are pooled, the crews being run first in, first out, while the engines are put on the different trains to the best advantage to the company. There are 52 crews, 41 being in the freight pool and 11 in the passenger pool. To keep these crews going requires an average of 37 engines, 30 being used in freight service and 7 in passenger service. But if necessity demands it, the engines of one pool are used in the other. Here will be noted a saving of 15 locomotives over the old system of regular engines, and, counting the average value of an engine at $10,000, makes a saving of $150,000 in the amount invested in machinery.

In the pool, as we have it, each engine is equipped with headlight and signal oil cans, and the necessary tools in locked boxes, the keys being kept on a large board in the foreman's office. All that an engineman transfers from one engine to another is an oiler, a supply can for engine oil, a tallow pot and a torch, all these being marked with his number. The crew is called about an hour and a half before time to leave the roundhouse. When called, they know what train they will take and where they will go; but the engine they are to have they only learn on reaching the foreman's office, where they receive the keys to the boxes. The engineman goes at once to the oil house, gets his cans, goes directly to the engine, and proceeds to fill all cups, and oils and inspects the engine. While the engineman is thus engaged, the fireman is lighting the lights, if at night; filling the lubricator, getting the signals ready, if any are to be carried, and wiping the windows and the inside of the cab.

On coming in, while the engineman is looking the engine over for his work report, the fireman is filling the headlight, cab and signal lights. The three cans and the torch, previously described, are turned in at the oil house, and the crew goes home and stays there until called again. This is the simple statement of the working of our pool. I will now take up more specifically some of the methods followed in the different branches, beginning with what is, to my mind, the best point in the system, viz., the engine inspection.

An engineman comes into a division point and places his engine on the clinker pit track. Before turning it over to the hostler, he goes over it carefully, examines all bearings, and inspects it as thoroughly as can be done by getting around on the outside, and reports all work that he finds to be done. The engine is coaled, sanded, the tank filled, the fire cleaned, and then placed in the roundhouse. While in the roundhouse, over a pit, an inspector goes over this engine carefully and thoroughly. While this is being done, the boilermakers are inspecting the boiler, flues, grates, ash pan and front end. The man who regularly packs truck and driving boxes, looks over all packing to see that it is not settling away from the journals. The time he now spends in watching the packing and keeping it in shape, he used to spend in packing hot boxes. An official report for August, 1899, showing an engine mileage of 299,205 miles, has but two engine delays from hot boxes—one of 23 minutes for a hot driving box, and one of 30 minutes for a hot engine truck. When all work reported is done, the engine is ready for another trip. Let me say here that the engines are always placed in the roundhouse, over a pit, for the inspectors. No amount of "hurry up" from the dispatcher varies the rule. I do not intend to criticise the engineman's inspection under the old system; but his inspection is usually made when the engine is covered with dust and oil in summer and with ice in winter, and he can not be expected to find a great many defects that might be more readily found when the engine is in the roundhouse and cleaned. But no matter how thorough any one inspection may be, three inspections are better than one. Another point worth considering is that the engine stands in two different positions under the three separate inspections, and what might be hidden by counterbalances and other moving parts, in one position, would more than likely be exposed in the other. In refutation of the argument that an engineman can inspect his engine better than anyone else, the result here is a great decrease in breakdowns and engine failures, arguing conclusively for the system of inspection followed by this pool. The same official report, previously quoted, shows but five other engine delays for the month of August, 1899, none of which could be traced to poor inspection. They are as follows: Engine not steaming, broken spring hanger, broken valve stem, injector not working, and failure of air pump. The entire report shows but these seven engine delays for 299,205 engine miles, or one delay for every 42,743 engine miles; while the best showing for the same month, on a non-pooled division, was 16,472 engine miles to one delay. This, in my opinion, can be credited to nothing but the careful system of inspection carried on under the pool.

When the engineman gets his cans, he makes a ticket for just what oil it took to fill them. The tallow pot holds four pints, and the engine oil supply can holds five. If the latter contained three pints when he turned it in, he makes a ticket for the two pints it takes to fill it. In this way an account is kept of the oil each man uses. Of course, if care is not taken to only put in the lubricator just what oil is needed on the run, it becomes necessary to drain the lubricator, or else give the man who follows that amount of oil. With a little experience, just the right amount can be put in. To keep an account of the coal consumption by each engine crew, the tanks are filled to a uniform height. An engineman receives the engine with a full tank of coal; and when he leaves it, he makes a ticket in blank; the hostler fills the tank to the regulation height, and fills in the ticket with the amount it takes. Under the pool system, the fireman does not go to the roundhouse and put in three or four hours cleaning his engine, nor does the engineman do the numberless little things that he used to do under the old system of regular engines.

I can remember the time when it was thought that only certain men could run the fast and important trains, but the pool has exploded all this. It has been thoroughly demonstrated that it is the engine, and not so much the man, that gets an important train through on time. With us, we have an extra passenger list, consisting of the oldest runners on freight, and at the home division point they are given the preference on extra passenger runs; but at all division points away from home, the pool crews take their turns as it happens on such runs.

In arguments against the pool system, a great deal of stress is placed on the assertion of great increase in roundhouse work and running repairs. A little anaylsis, in detail, of this subject shows that the increase in expense is not so very great. Of course, the salary of the engine inspector is extra, but our decrease in engine delays and failures on the road is worth many times this expense to the company. So, looking at it from almost any standpoint, there is not much but advantage. In the matter of oil records, the division where the pool is in operation makes a showing for August, 1899, of 70.02 miles per pint of valve oil, as against an average of 74.3 miles per pint of valve oil on three other divisions where the pool is not in operation. On engine oil it is 67.25 against 63.89; in one case the showing being against, and in the other in favor of, the pool. What I wish especially to show is that there is no great difference

* Extracts from a paper before the Western Railway Club, November meeting, by Mr. M. E. Wells, locomotive engineman on the Burlington & Missouri River Railroad in Nebraska.

either way, and that there is no argument against the pool in these figures.

In the matter of coal, the showing is in favor of the pool:

	Pounds of Coal per 100 Ton-Miles. Freight.	Passenger.
Pool division	20.70	29.80
Regular engines	24.00	33.00

Engine crews make about 3,500 miles per month, and, of course, with regular engines, the engines would make about this mileage. Here are figures showing the mileage made by some pool engines in one month: 7,688, 7,228, 7,316, 6,014, 5,648, 5,702. I wish to speak especially of the mileage recently made by a passenger engine in one month, and this record is being kept up from month to month as steady work. This engine doubles a division, making 333 miles per day. This it did for twenty consecutive days, when it lost one trip for repairs, and then went back on the run for the rest of the month. This shows a mileage for this engine during the month of 9,657 miles.

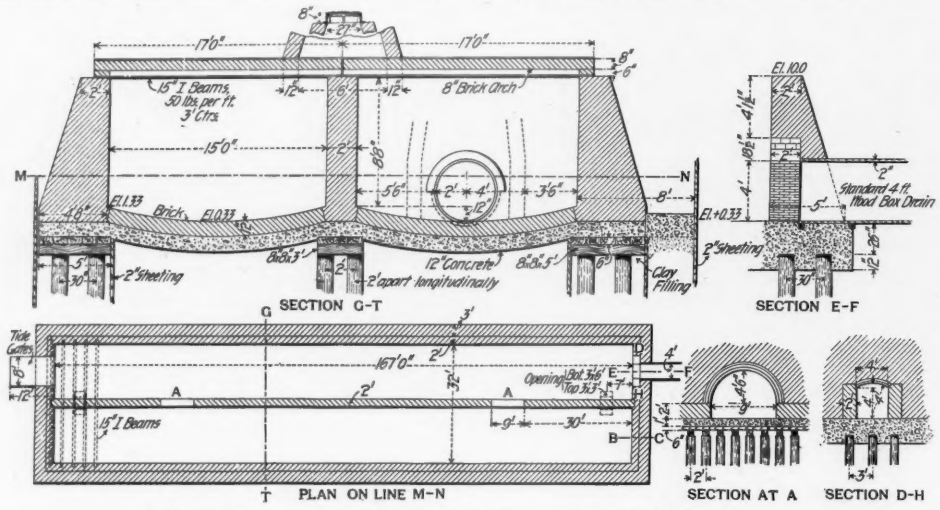


Fig. 1.—Surface Drainage Reservoir for Grounds Below High-Tide Level.

The "Boston & Providence Extension."

(*Concluded from page 839.*)

As before stated, a considerable portion of the track of this extension is below tide. A drain is laid between the tracks the whole distance and this empties into a reservoir at the north side of Broadway close to Fort Point Channel. This reservoir has a capacity of about 200,000 gals. It covers an area of 30 x 167 ft. and has concrete side walls and bottom invert. A brick pier passes through the center to reduce the span of the top support. The latter is composed of 18 in. I beams 3 ft. apart center to center, with tie rods and brick arches placed between. The top surface is made smooth by concrete and cement coating.

On account of the difficulty of keeping the work free from the pressure of water coming in through the old sea wall at high tide, some of the cement was washed from the concrete before the work was finished and more or less serious leaks occurred. These were stopped by forcing grout, under pressure, by means of a small hand pump, into the defective concrete.

Two automatic 4 ft. tide gates allow water to flow out of the reservoir into Fort Point Channel at low tide, and prevent backing up of water at high tide. These gates are similar in design to those used by the city of Boston at sewer outlets.

At Dartmouth Street, which crosses both the Boston & Providence and the Boston & Albany roads at the beginning of the "extension," the truss bridge, 145 ft. long, which formerly carried the street over both railroads, was moved northward 35 ft. This job was done on a Sunday and the moving was successfully accomplished in about 15 minutes, the only accident being the failure of a hydraulic jack as the bridge was about to be lowered to its new seat, which allowed one end of the bridge to settle 20 in. and at the same time slide about 7 ft. to one side, without, however, doing any material damage.

The moving of this bridge was effected by placing wooden false end posts at the first pannel point from either end, under which jacks were placed to raise the bridge. (See Fig. 2.) A track of steel rails and a nest of steel rollers carried the bridge while it was being pulled to its new position with block and fall, by hand power. When over the new position jacks were again used to raise the bridge, to take out the rollers and lower it into place. To make the foundation for the new support of the south end of this bridge it was necessary to use short piles, putting in three, one above another, and special pile drivers were made which could be used beneath the bridge. The piles were placed approximately 2½ ft. between centers. It was found that the upheaval of displaced ground raised the last section driven from 1 to 2 in. above the lower sections. This necessitated going over the entire area with the pile driver a second time, to bring the sections of the piles together. The sections were joined together by an iron sleeve and dowels. These piles were tried with test loads and found to be satisfactory. Two special drivers were used in driving the short piles; one 18 ft. over all, and the other 15 ft. Hammers weighing 2,000 lbs. were used in both.

The most difficult and costly single piece of work in connection with this improvement was the construction of the four-track roadway beneath the Hotel Edinburgh, a large six-story apartment house on Columbus avenue, which was left undisturbed in its location, although the foundation had to be taken out from under about three-fourths of its area. The building was thought too valuable to destroy, and plans were made whereby the four tracks of the extension were carried directly under it. Piles were driven under the structure for a pier between the two pairs of tracks and for an abutment at the north side of the tracks, the latter being in line with the north wall of the building. On the piers and the abutment were placed 24-in. beam box girders to support the building. On these girders are placed secondary beams which carry the walls directly. This girder floor system was designed to carry safely a uniform load of 500 lbs. per sq. ft., and a concentrated load produced by a 15-ton road roller. A test was made of the floor after construction with satisfactory results. The small distance between track centers under this building (14 ft.) necessitated the use of a pier only 2 ft. in width. The pier is of brick, with footing and belt and top courses of granite. The north pier or abutment, of similar construction, is 3 ft. in width.

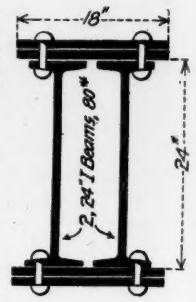


Fig. 9.—Beam Box Girder.

Some idea of the magnitude of the task of rebuilding the foundations of the Edinburgh may be gained from the drawings and half-tone engravings. Fig. 7 is a plan showing the arrangement of girders in the new foundation. The greatest length of the building, east and west, is 130 ft. and the extreme width 88 ft. The weight of the outside walls for the whole height was calculated to be 8,500 lbs. per linear foot,, and of the inside walls, 7,500 lbs. The calculated live load on the first floor is 100 lbs. per square foot and on each upper floor 50 lbs. The approximate load per pile in the foundation is five tons. Fig. 8 shows a transverse section on the line C D of Fig. 7, and a longitudinal section on the line A B, Fig. 7.

A typical beam box girder is shown in Fig. 9. The beams are of steel and the size is based on a maximum extreme fiber stress of 13,000 lbs. per square inch, the rivet holes in both flanges being deducted. In the diagonal partition walls the girders are made of 12 in. beams.

Before the changes were begun the building was strengthened by putting in horizontal iron rods, to hold the walls in position, on the second, fourth and fifth floors. The portion of the building remaining on the original foundation is triangular in shape, on the south side, as shown in the drawing, Fig. 7. This is about one-quarter the area of the building. This partial disturbance of the foundation necessitated the most careful shoring while taking out the old supports, but no settlement has yet occurred. Provision has been made, however, by means of pockets in the masonry under the longitudinal distribution beams, to raise, if necessary, any or all portions of the building supported by the new work.

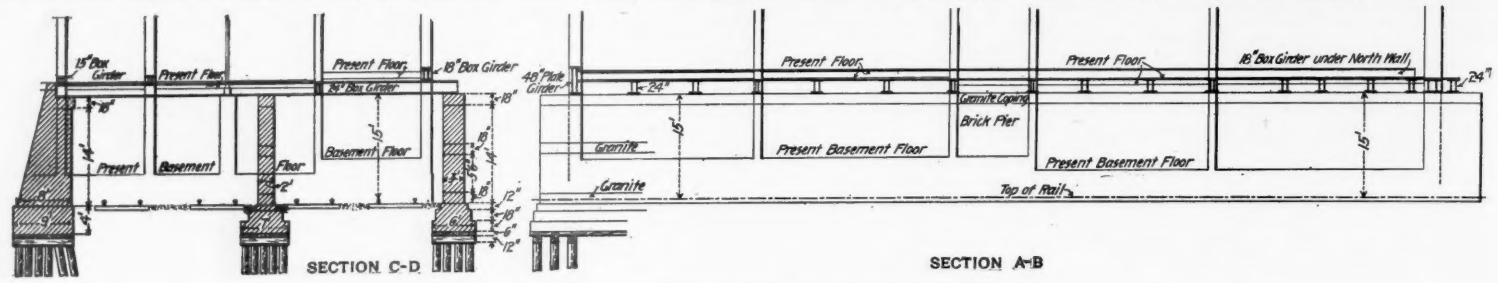


Fig. 8.—The Edinburgh; Transverse and Longitudinal Sections of Foundation.

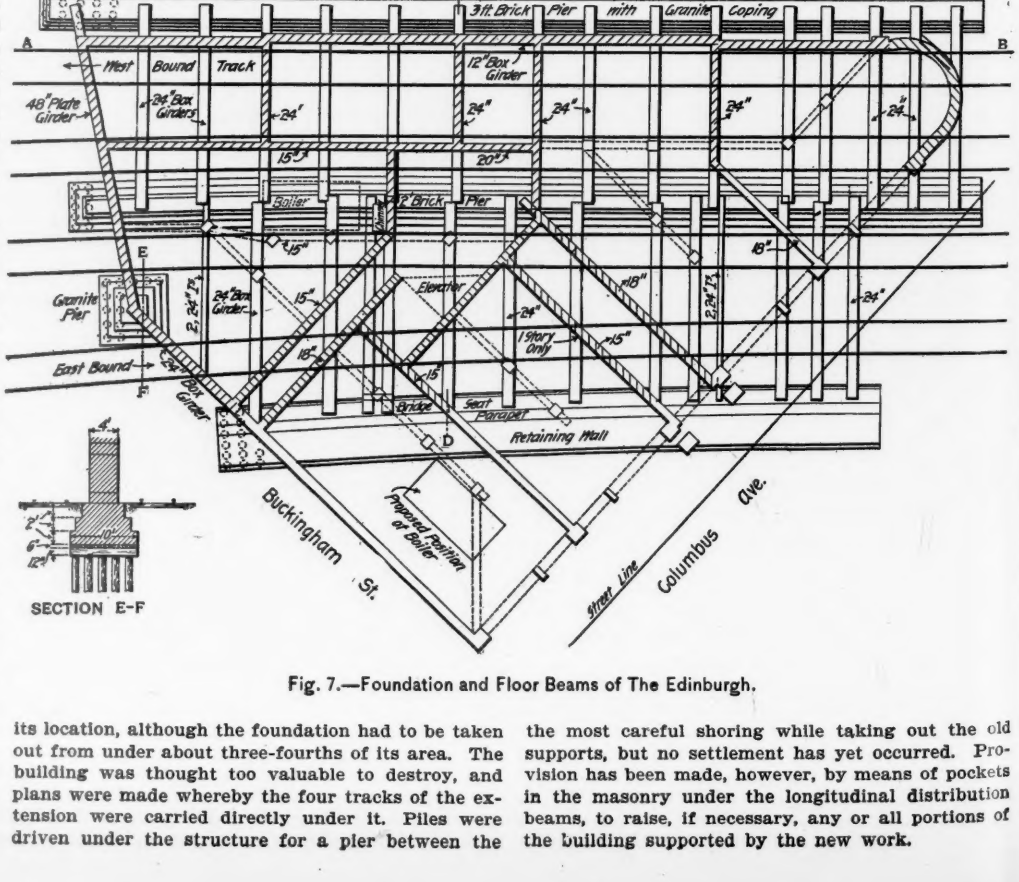


Fig. 7.—Foundation and Floor Beams of The Edinburgh.

The New East River Bridge.*

Mr. O. F. Nichols, M. Am. Soc. C. E., lately delivered an address on the New East River Bridge before the Broadway Merchants' Association of Brooklyn. As an addition to our record of the history of this great work, we give some extracts from this address;

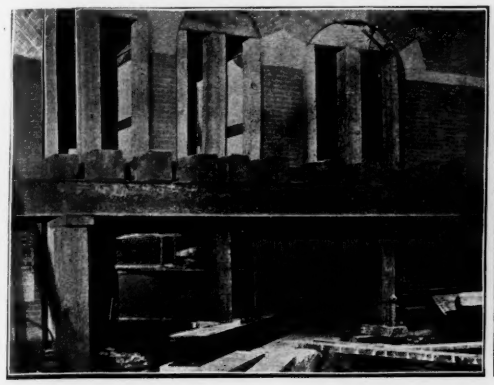


Fig. 3.—The Edinburgh; Temporary Shoring. Permanent Steel Support Visible Just Inside

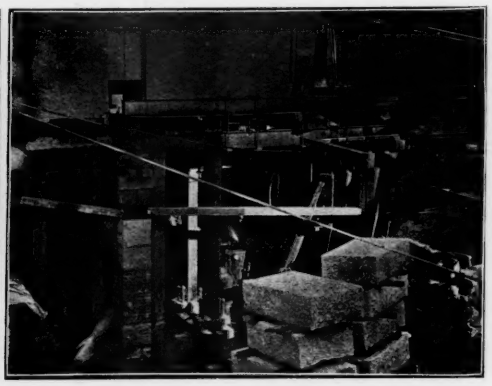


Fig. 4.—Shoring on the West Side of The Edinburgh End of Middle Pier at Left of Centre.

The bridge was required by the act of authorization to be a suspension bridge. This cannot be clearly explained and was somewhat unfortunate, since a suspension truss, erected on the cantilever principle, could have been built in a shorter time and probably at a lower cost. It was decided to provide two carriage-ways of 20 ft. each and four lines of trolley tracks and two tracks for the use of elevated railways. Two foot-walks each 12 ft. wide and two cycle paths, each 7 ft. wide, will also be located immediately over the trolley tracks on the main and end spans.

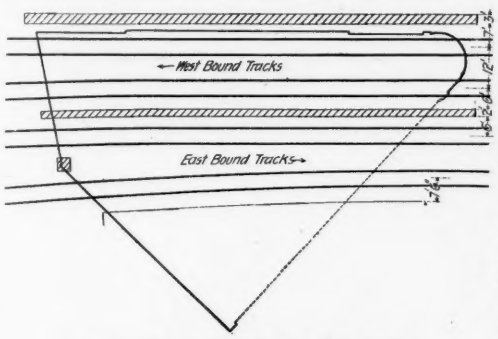


Fig. 10.—Tracks Beneath The Edinburgh.

The ground at the terminal of the bridge is about 20 ft. lower than at the old bridge (that is, the Brooklyn Bridge), and this, with the condition that the gradients should not be steeper than on that bridge made it necessary that the new bridge should be one-sixth longer than the old bridge; dictated that all the tracks and the roadway should be on the same level at the middle of the river span and fixed the minimum width of the bridge at 118 ft. The great width of the bridge, 40 per cent. more than that of the old structure, involved careful study of the problem of the number of cables to be used and of the method of loading them. It was finally decided to use four cables with two trusses, the car tracks all being placed between the trusses, and the roadways outside of them. It was also decided that the portion of the cables between the anchorages and the towers should not carry any portion of the bridge directly, but act merely as back stays. This materially shortens the cables and diminishes their size and cost.

It was found impracticable to carry all the tracks and roadways through towers of masonry without making these towers wider and heavier than desirable; moreover, the use of towers of steel would result in an immense saving in the weight of the towers as well as in the size of the foundations, and effect a great economy in time and cost of construction. Masonry towers for the new bridge would necessitate foundations more than twice as large as those actually built and would cost five times as much and require three times as long to build as the towers of steel. The steel towers could be more easily carried to a greater height and this would diminish the size of the cables by permitting them to have a greater deflection.

The stiffening trusses will be about 40 ft. deep, or about three times as deep as those of the old bridge, and will extend continuously from anchorage to anchorage. The use of the viaduct of steel skeleton construction will also effect a great saving in the time and cost of construction of the approaches and leave the right of way freer for public uses.

The caissons were built of timber and iron and were 60 by 76 ft. in plan, and the largest one was 52 ft. high and was placed in about 60 ft. of water. All of the foundations were sunk until satisfactory bearing was secured on the solid rock. The north caisson on the Brooklyn side passed through more than 15 ft. of rock at its southwest corner, and the pneumatic excavation reached a depth of 115 ft. at its northeast corner. In the caisson work no fatalities resulted among the men and no case of permanent paralysis. The hours of labor and rates of wages were varied according to a scale agreed upon with the sand-hogs union; on the Brooklyn side, the scale was as follows: for all depths up to 55 ft., $2.50 per day of eight hours.

For depths from 55 to 70 ft., $2.75 per day of six hours' work.

For depths from 70 to 80 ft., $3 per day of two hours' work.

For depths from 80 to 90 ft., $3.25 per day of one and one-half hours' work.

For depths over 90 ft., $3.50 per day of one and one-half hours' work.

Pneumatic work has rarely, if ever, been done at a depth exceeding that of the north caisson on the Brooklyn side, and this is considered about the limit of which this work can be safely done.

The tower foundations are now completed and ready for the steel towers, and the anchorages are more than half completed. The steel stowers, rising 330 ft. above the river, are now contracted for and will be completed early in 1900, and the cable construction can then begin and should be completed within a year.

Forty thousand cubic yards of earth were excavated for the construction of the Brooklyn anchorage, much of it below the water level. This anchorage rests in a bed of natural sand, while the Manhattan anchorage rests on about 3,500 piles each about 30 ft. long, driven through a bed of clay and into a bed of sand overlying the rock. Each anchorage has a timber platform about four feet thick, containing one and one-half million feet of timber, on which the concrete is placed to receive the masonry. This concrete in Manhattan is 13 ft. thick and contains 15,000 cu. yds.

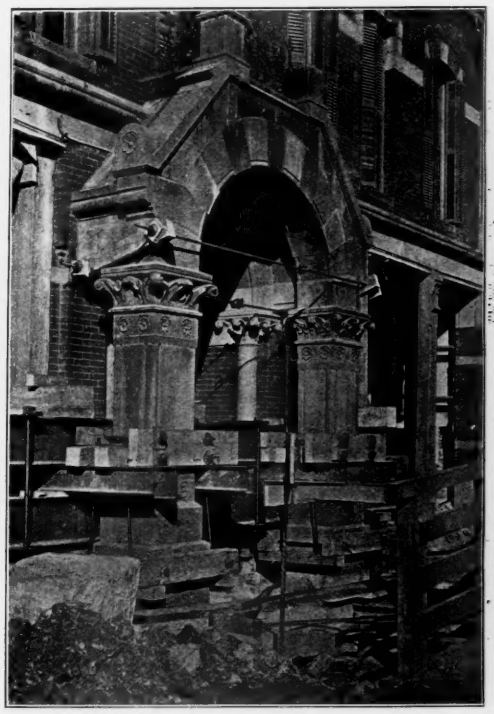


Fig 5.—Shoring at Main Entrance.

The stone masonry of each anchorage amounts to about 45,000 cu. yds. This mass of masonry is cored out by chambers to lessen the amount of masonry and to receive the anchor chains for the cables.

Each anchorage contains about 1,600 tons of steel for fastening the cables which enter the masonry at the front near the top, where each cable is secured to the end pins of a double line of steel anchor bars extending, in two separate curved lines, down to the great platforms of steel girders, on which the larger portion of the anchorage masonry rests. The anchor bars are 9 in. by 2 in., about 15 ft. long, and connected together by pins 7 in. in diameter. There are 426 bars for each cable and 1,700 bars in each anchorage. Each line of anchor bars terminates in a casting weighing about ten tons, to which it is secured by the lowest pin at about the level of the water in the river. The great steel girder platforms which resist the upward pull of the anchor bars, are so placed that the weight of the platform and a large portion of the masonry will rest directly on these castings until the full pull of the cables is applied.

The steel towers which rest on the tower foundations will be about 50 ft. higher than those of the old bridge. They will each be surmounted by four cast steel saddles for the support of the cables. These saddles will weigh about 32½ tons each, and will be arranged to move slightly on rollers as the cables change in length from changes in load and temperature; these steel towers each weigh 3,000 tons. The erection of these cables cannot begin until the saddles are in place, but it is expected that the intervening time can be profitably employed by the contractors in preparing plans and plant and making the material for the work. The pull on the four cables, due to the weight of the bridge and its load, is about 20,000 tons.

The approaches can be built as soon as the property has been acquired for their location and quite independently of the rest of the work. The Manhattan approach is nearly twice as long as the Brooklyn approach, and together they will require about 18,000 tons of steel for their construction.

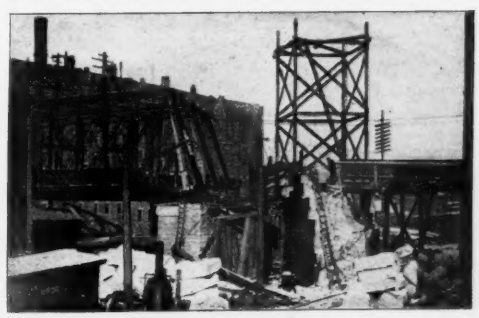


Fig. 2.—Dartmouth Street Bridge (South End) in New Position.

The entire construction of the bridge will involve the destruction of about 500 buildings, the excavation of about 125,000 cu. yds. of material, and the use of about 60,000 cu. yds. of concrete, 6,500,000 ft. of timber, 130,000 cu. yds. of masonry, and 45,000 tons of steel.

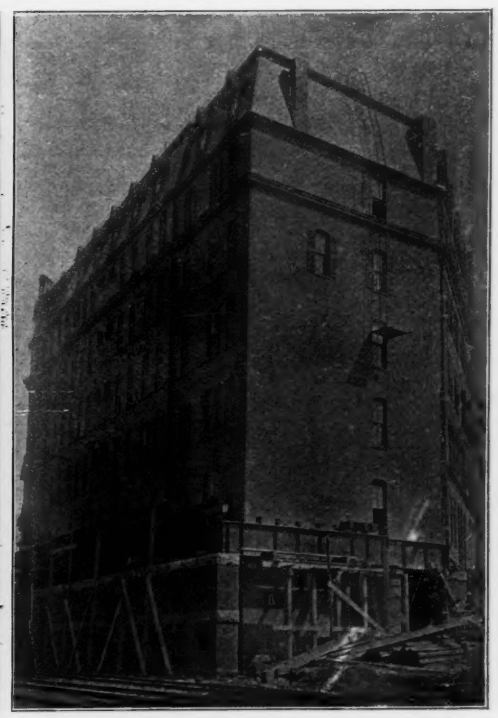


Fig. 6.—West End of The Edinburgh, Showing North Pier, End of Middle Pier and Small Pier Under Corner. Girder Ready to be Placed Under Wall Between Middle and North Piers.

It is not intended to have any immense portals or great terminal structures at the entrances to the bridge. The entire width of the structure will be left wide open at the ends as befits the entrance to

* For previous articles on the New East River Bridge, see the Railroad Gazette, March 3, p. 153; Nov. 17, p. 789; Nov. 24, p. 803.

a broad avenue connecting the street systems of two boroughs. Large plazas or open squares are to be provided to avoid crowding of vehicles of all kinds and every effort will be made that they may be fully and wholly used for this purpose.

The elevated railway tracks will pass at a good elevation over this plaza. The cycle paths will emerge on to the plaza in a line with the axis of the bridge. The trolley tracks will pass on to it outside of the cycle paths and the carriage-ways outside of these. The foot-walks for pedestrians will be carried under the cycle paths on the approaches and discharged into the two cross streets nearest the terminals and away from the rush of vehicles of all kinds.

It is estimated that the cost of the new bridge will be about $8,000,000, which is about $3,500,000 less than the cost of the old bridge, and the new bridge will be much wider and about four times as strong as the old one. The cost of right of way will swell the cost materially, nearly sixty per cent. more real estate must be taken, and the value of the property taken will now be greater than in 1880. It is probable that the total cost of the new bridge will exceed that of the old bridge, but there can be little doubt that its value to the city will be out of all proportion vastly greater than its cost.

As to the general principles which should govern what may be called the architectural features of such a work, we have the expressions of some of the great masters in art criticism to justify the design, and I shall be much surprised if the new bridge does not in a large measure satisfy these high standards. It is a sound architectural principle that if you have a load to carry there is no disgrace in being seen carrying it. I believe that when this bridge is completed the intelligent critic, as well as the ordinary observer, will be impressed with the main fact that here is a structure built under peculiar and somewhat hampering conditions, which supports safely and carries conveniently a great load, a mighty and civilizing stream, and that it will be perfectly evident that it does this, and why, and that the immensity of its proportions and the grandeur of its labors will justify the simplicity and sincerity of its design.

Now, when will it be done? Ah, that is a difficult question to answer. The inability of the city to meet its financial obligations and to permit the letting of new contracts in 1896, and the difficulty of getting large quantities of steel at any price this year, have done much to delay a work which should have been commenced ten or fifteen years ago, and which would be worth two or three million dollars a year to Brooklyn and Manhattan to-day. All the principal contracts will be let within another year, and I think that it can safely be said that the bridge is, as to the cost of the structure and as to time of construction, fully one-half done, and that unless some unforeseen accident should occur to delay, it will be completed at the time which this estimate would indicate.

The Close of Lake Navigation.

The season of lake navigation which closed Dec. 10 was remarkable in several particulars. The season opened two weeks late, but no great storms have interfered with navigation, and no big losses have been sustained by the underwriters. In April contracts were made at low rates and there was then no indication of the boom which began late in May and advanced steadily through June, July and August, until September, when carrying charges reached the highest point in recent years, even the rates after the break in October being higher than in other years. Where a year before only the largest and most modern vessels could be sold at any price, it was difficult this season to name too high a figure. The following table shows the range of average rates in cents per unit, counting from day to day and not on the amounts carried, as compared with 1898.

	1899.	1698.
Iron ore, Escanaba to Ohio ports	94.8	50.8
Iron ore, head of Lake Superior to Ohio	129.5	61
Corn, Chicago to Buffalo	2.7	1.5
Wheat, Duluth to Buffalo	2.6	1.8
Hard coal, Buffalo to Chicago	72.7	28
Soft coal, Ohio ports to Duluth	45.4	23.4

Figures for the Sault Ste. Marie Canal to Dec. 2 show that the total tonnage of the canal was 24,636,553 tons of freight, which is 3,400,000 tons more than for the entire season of 1898, or an increase of 15 per cent., while the season of 1898 was 12 per cent. over 1897, and it is estimated that next season's freight traffic will reach 30,000,000 tons. The passenger traffic up and down the lakes this season increased 20 per cent. over last year.

The 14-ft. channel between Lake Erie and deep water at Montreal was completed this season by the Canadian Government at a cost of $70,000,000, but vessel-men do not believe that it will greatly increase the Canadian share of the grain traffic.

Although the loss of property was much smaller than for many years, the loss of life was greater, 100 lives being lost in 1899 against 95 in 1898, and 68 in 1897, but not a single passenger was lost in any disaster to regular lines and not one was injured.

The high lake rates on grain from Chicago have been favorable to the railroads. Where formerly 65 per cent. of the grain was carried to the seaboard by boat and 35 per cent. by rail, the percentage is about reversed.

The control of lake vessels has passed from individual owners to large corporations. Within one week in October vessels to carry 10,000,000 tons of ore during next season were chartered by the Rockefeller interests at $1.25 per ton for the season, and 90 per cent. of the carrying capacity of the boats on the lakes was secured on that basis. It is believed that these conditions must cease as soon as more ships can be built; but although the shipyards are full of contracts, they cannot get steel, as plates are not obtainable and present indications are that not one-half of the vessels promised for next season can be delivered.

Railroad Hygiene.

At the last meeting of the Association of New England Railroad Superintendents, Dr. G. P. Conn, Division Surgeon of the Boston & Maine, at Concord, N. H., gave the members an interesting talk on railroad hygiene. Dr. Conn gave numerous facts about ventilation and car heating, touching upon some of the difficult problems connected with these subjects. One of the most valuable parts of his address was that in which he emphasized the importance of making physical examinations of men entering the railroad service. If railroad officers realized the large percentage of applicants excluded from the army, the navy and the Government Civil Service on account of unsatisfactory physical condition, more attention would be given to this subject. Some railroads already have in force rules governing this matter and others are coming to appreciate it more and more. Numerous organic diseases, such for example as heart disease and mental imperfections, are not likely to be detected except by a scientific examination. Touching upon epidemic and contagious diseases, as affecting the business of transportation, Dr. Conn said that railroad managers should not wait for states and municipalities to act, but should themselves be leaders of public opinion. In closing, Dr. Conn urged every Superintendent to take good care of his own health. Every person has a value, and the more complex the work he does in the world the greater the loss if he dies before his time. Scott, Hoxie, Talmage, and other railroad kings of former days did brilliant work, but none of them reached old age. Since the days of Scott the average life of the chief officer of the Pennsylvania Railroad has been only about 10 years, and Thomson lasted only three years. Facts like these emphasize the danger of working the human machine beyond the elastic limit. The policy of many a large railroad is practically vested in one man, and it is an economic misfortune if a man in such a position has to retire prematurely or suddenly.

Chicago Drainage Channel.

Two weeks ago we expressed a doubt as to the ability of the Sanitary District of Chicago to fulfill its promises and open the Drainage Canal at an early date. One could scarcely think otherwise in view of the position taken by the Special State Commissioners appointed to inspect the Canal, that all work, which in any way would obstruct the flow of water, must be completed before the opening. Since then a series of conferences has been held that the differences between the Sanitary District and the State Commissioners might be adjusted, but nothing has resulted from these meetings; in fact it would seem that they have rather given rise to more difficulties.

The Special Commission refused to recede from its position and again said that the unfinished work named in the preliminary report must be completed before a final report can be made for the approval of the Governor. In addition it was brought out at the first conference that the Governor proposed to withhold his approval until it was assured that navigation in the Illinois & Michigan Canal would not be interfered with; as with the completion of the Drainage Channel the City will stop the pumping of sewage at Bridgeport, which has been the source of supply for the upper canal section. At a later meeting the Sanitary District proposed to build a connection, or feeder, between the two canals at Romeo, which would be 46 ft. wide and 16 ft. deep with a minimum capacity of 6,000 cu. ft. a minute, sufficient for purposes of navigation; in addition the Sanitary District would widen and deepen the Illinois & Michigan Canal from the point of connection to the first lock. The estimated cost of this work was about $218,000. This proposition was refused by the Commissioners of the Illinois & Michigan Canal, who insisted that the connection be made at a point called the Sag, about seven miles above Romeo, and that the Calumet District be drained through this connection; the estimated cost being about $500,000. The Sanitary District trustees, however, refused to consider the plan and proposed as an alternative that they would pump 25,000 cu. ft. of water a minute at Bridgeport until July 1, next, sufficient to maintain the Canal's water power, when the Legislature will have had time to make other provision. Or, they would pump 6,000 cu. ft. indefinitely or until the Legislature made other arrangements. But both propositions were refused. During the discussion it was shown that to pump the additional 19,000 cu. ft. required to maintain the Canal's water power at Lockport would be an unprofitable operation for the State, costing about $40,000 a year, for which the Illinois & Michigan Canal gets yearly in rents from private parties $2,700.

The last conference was adjourned with the understanding that the suit now pending in the Federal Court would have to decide the liability of the Sanitary District for maintaining the summit level in the Illinois & Michigan Canal. Of course this will further delay the opening of the Drainage Channel.

The annual meeting of the Board of Trustees of the Chicago Sanitary District was held at Chicago Dec. 5, and President William Boldenweck made his report of the work of the year. It shows that litigation was almost continuous, and the 78 suits and other legal complications met with during the year are discussed in detail. The subject of the water power to be developed was touched upon and the opinion expressed that the Board made a mistake in putting restrictions in the way of those who offered to lease the power, which lease would have brought an income of about $100,000 a year to the District. The hope was expressed that the City of Chicago would arrange to build and equip a plant to utilize the power, paying the Sanitary District for it. The report recommends that all parts of Chicago not at present within the boundaries of the Sanitary District be annexed to it. The proposed deep waterway connecting with the Missouri River is endorsed, and it is estimated that such a connection would cost $25,000,000 from Lockport to the mouth of the Illinois River. The total expenditures for the Drainage Canal from its organization to Dec. 1, 1899, were $31,602,598. President Boldenweck was re-elected without opposition for the ensuing year, which will be his third term, and the other officers were also re-elected, including Mr. Isham Randolph, Chief Engineer.

A Very Heavy Consolidation Engine for the Illinois Central.

[WITH AN INSET.]

The 108-ton consolidation locomotive shown herewith was recently sent from the works of the Rogers Locomotive Company, Paterson, N. J., to the Illinois Central Railroad for use on one of the divisions south of the Ohio River, where the grades are heavier than on the divisions with which it connects.

According to our records, this is next to the heaviest consolidation engine ever built.* The Pittsburgh locomotive on the Union Railroad weighs seven tons more and has a much larger heating surface. The Rogers locomotive weighs 216,000 lbs., 196,000 lbs. of which is on the drivers. It has a total heating surface of 3,203 sq. ft. and a grate surface of 38.5 sq. ft. This engine was built to haul trains of 2,000 tons over grades 38 ft. to the mile, and will be used on the same division as the Illinois Central 12-wheeler, which was recently put in service.†

The center of the boiler is 9 ft. 2 in. above the top of the rails, and the top of the stack, sand-box and dome casing are all practically 15 ft. above the rails. The crown sheet of the firebox is 10 ft. 6 in. above the rail at the flue sheet.

The tender is of the Illinois Central Railroad Company's standard pattern, with a capacity of 5,000 gals. and space for coal of 10 tons. It is reasonably certain that this tender will be found too small for the required service and it is proposed to build one at the Illinois shops especially for this locomotive having a total length of about 30 ft.

Through the courtesy of the Rogers Locomotive Works we are able to show the details of the construction of this engine. The description of the way in which the center of gravity of the locomotive was found was sent to us by Mr. Reuben Wells, Superintendent of the company. As a result of the test made, it was found that the center of gravity of this engine was 50½ in. above the top of the rail.

A study of the engravings will show the careful consideration which has been given to the many details. There are many evidences in the designs of an effort to reduce the dead weight as much as possible. The following table will give the main features in the construction of this engine.

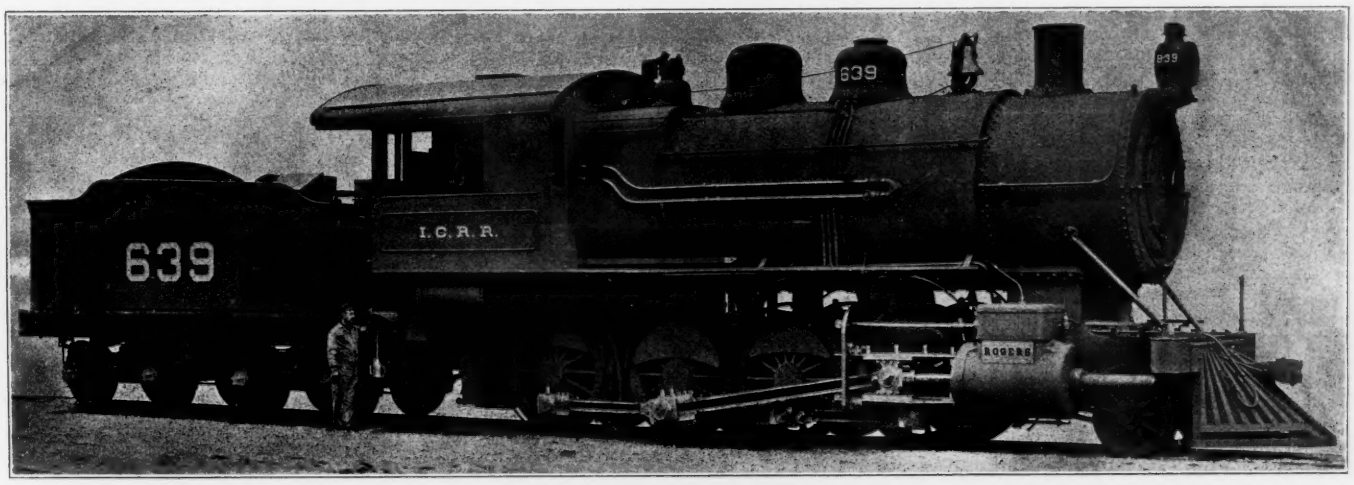
Rogers Consolidation for the Illinois Central Railroad.

Cylinders	23 in. x 30 in.
Total weight, in working order	216,000 lbs.
Weight on drivers	196,000 lbs.
" " truck	20,000 lbs.
Driving wheel base	16 ft. 3 in.
Total " "	24 ft. 5 in.
Driving wheels—diameter outside of tire	57 in.
" wheel centres	Cast steel, turned to 50 in.
" axles	Nickel steel.
" axle journals	9 in. x 12 in.
Truck axles, iron journals	6 in. x 10 in.
" wheels, McKee, Fuller	33 in. diam.
Boiler	Belpaire type.
" diameter at smokebox	80 in.
Firebox, length inside	132 in.
" width at grate	42 in.
" height at flue sheet	78 in.
" " " back "	75 in.

* See Railroad Gazette, Oct. 28, 1898, and Sept. 29, 1899.
† For description see Railroad Gazette, Sept. 29, 1899.

Tubes, number	417
" diameter	2 in.
" length	13 ft. 8 in.
Heating surface in firebox	252 sq. ft.
" " of tubes	2,951 sq. ft.
" " total	3,203 sq. ft
Grate surface	38.5 sq. ft.
Fuel	Bituminous coal.
Material in boiler	Carbon steel.
" " tubes	Iron, special brand.
Working pressure	210 lbs.
Thickness of sheets in boiler	⅞ in and ⅝ in.
" " " " firebox crown	1⅞ in.
" " " " sides and back	⅝ in.
" " " " tube sheet	⅝ in.
Staybolts	U. S. iron 1 in. diam. spaces 4-in. centers.
Piston rods	Nickel steel, 4¼ in. diam., extended type.
Pistons	Cast steel, cast iron packing.
Crankpins	Coffin toughened steel.
Guides	9½ in. wide, wrought iron, case hardened.
Cab, material of	Steel.
Smokestack, material of	Cast iron.
Injectors	Hancock Composite No. 8 and No. 10.
Sanding device	Leach's, style D, triple pipes.
Lubricators	Detroit No. 4, with Tippet attachment.
Safety valves	Ashton, three 3-in., one muffled.
Metallic packing	United States.
Whistle	Barnes, 6-in.
Bell ringer	Higgenbottom pneumatic.
Tires	Krupp crucible, 3½ in. thick.
Springs	A. French Co.
Journal bearings	Cicero bronze.
Blow-off cock	Little Giant pneumatic.
Slide valves	American balanced 6-in. travel.
Steam ports	1⅞ in. x 23 in.
Exhaust ports	3¼ in. x 23 in.
Bridges, width	1⅝ in.
Boiler covering	Franklin Mfg. Co's.
Brake	Westinghouse-American
Couplers	M. C. B.-Isaac Johnson.
Tender	I. C. R. R. Co.'s standard pattern.
Capacity of tank	5,000 gals.
Space for coal	10 tons.
Tender frame	White oak.
Trucks	Fox pressel steel, floating bolster.
Wheels	36-in. McKee, Fuller & Co.'s, plate centre, steel tired.
Brake beams	Monarch.

A few of the features, as shown in the engraving from a photograph and on the line drawings on the inset, may be noted. The piston rods are of nickel steel 4½ in. in diameter and extended through the front end of the cylinder, as shown in Fig. 1. The sanding device is the Leach's style D with triple pipes. The engine is equipped with a smoke burner



The 108-Ton Consolidation Locomotive for the Illinois Central Railroad.

Mr. W. RENSHAW, *Superintendent of Machinery.* *Built by the* ROGERS LOCOMOTIVE COMPANY, *Paterson, N. J.*

similar in construction to those used on the Illinois Central locomotives. The boiler shown in Fig. 2 is the Belpaire type with a diameter at the smokebox of 80 in. The total number of tubes is 417. This engine has been designed to run on a working pressure of 210 lbs. The boiler is of carbon steel and the tubes are of iron. Extra heavy bracing has been used in the boiler, as will be evident from a study of the engraving.

Fig. 3 shows one of the steel castings bolted to the frame back of the cylinder saddle. These castings, which are also bolted to the cylinder saddle, extend back of the cylinders 50½ in. on the frames, thus binding them to the cylinder casting and relieving the cylinder saddle to a large extent of the severe strains due to twisting stresses.

Fig. 4 shows a cross-section of the firebox and smokebox and a rear view of the cab. The dimension, 50½ in., marked on the two views gives the height above the rail of the center of gravity of the locomotive as determined from the test referred to later in this article.

The steel driving box is shown in Fig. 5. It will be noted that in this part, as in many of the other details shown, the weight has been cut down in order to put as much of the total weight as possible in the boiler. The link and its hanger is illustrated in Fig. 6. The link is 3½ in. face and is supported on both sides by a horseshoe shaped hanger, the saddle being in two parts bolted to the back half of the link. The forward half is stiffened by a rib, A, on its front face. It will be observed that the pull of the rod has to be transmitted through the two bolts at the lower end of the front part of the link. The lifting shaft-arm end fills the space between its two upward extensions.

In order to avoid bent eccentric rods, cast steel yokes are used, the design of which is shown in Fig. 7. These yokes are placed at the driving axle between the link and the rock shaft. The yoke is suspended by a hanger, D, the upper end of which is held in the bracket, P, attached to a cross brace of the frame and with the lower end attached to the yoke by a pin at E. As shown at O, in the upper view, this yoke is double. The pin H passes through the two parts and also through the link block. The space at O is taken up in part with the link, bringing it as close as possible to the axle and giving as great a length of eccentric rod as the distance between the axles will allow. The radius of the link is 48 in. The gap in the yoke at the bottom is closed by a thimble, G, and a 1½-in. bolt. This arrangement brings the link, the yoke and middle of the pin of the rockshaft arm all in a direct line.

The center of gravity of this engine was found by suspending it on two steel pins 3 in. in diameter, the one at the front being put 6 in. in front of the cylinder saddle and the one at the back 6 in. back of the rear end of the boiler, and both the same distance above the rails and on the vertical center line of the engine. The engine, when suspended, was complete with all its parts in place and the boiler filled with cold water to the second gage, the drivers and truck wheels all clearing the rails about 2 in. The engine was as near as practicable in the same condition and of the same weight as it would be in working order. These suspension pins were supported at both ends and the bearing surface resting on them was horizontal in order to reduce to a minimum the friction at the bearing point. On trial, the bearing points, as first located, proved to be considerably too high. The pins were lowered and tested again several times until the engine balanced on the pivots. Screws were used at the ends of the bumper for testing and to keep the "roll" to either side within limits when the pivots had been lowered to the point of center of gravity. At that point, a lift of about 300 lbs. under the end of the bumper was sufficient to make the engine turn in the opposite direction. On removing the lifting force, the engine would not, of itself, return more than half way back to the vertical position, but required a lift of about 100 lbs. at the lower side to bring it sufficiently near the vertical to overcome the pivot friction, but when vertical and free it would remain so. It required about 100 lbs., however, to start it to turn in either direction. The tests show that the point of suspension was probably as near the actual center of gravity of the engine as it was practicable to put it. After the adjustments were all made and the center of gravity found, measurements showed the bearing point on top of the steel pin at each end of the engine on which it rested to be 50½ in. above the top of the rails as the engine would be when the drivers are resting on the track. That point is 3¾ in. above the top of the main frames. Assuming the bearing point of the drivers on the rails to be 56 in. apart, then the base on which the engine runs is 1.10 times as wide as the distance its center of gravity point is above the rails. Mr. R. Wells, the Superintendent, says: "Without positive knowledge to the contrary, most persons, we think, judging from appearances only, would conclude that the center of gravity of a locomotive like this must be considerably above the point actually found."

If the center of gravity of a locomotive like this is 10 per cent. lower in height than the base on which it is carried is wide, it is probable that the weight could be proportioned so that the center of gravity could be made still higher without affecting the running of the engine.

American Society of Mechanical Engineers.

More than 700 persons attended the annual meeting of the American Society of Mechanical Engineers held in New York last week. The names of the newly elected officers and abstracts of some of the papers were printed in our last issue. Many of the papers called forth little or no comment, but, as a whole, the discussions were of more than usual interest and value.

On Wednesday evening nearly the entire time was taken up with discussions of Mr. M. P. Higgins' paper on "Education of Machinists, Foremen and Mechanical Engineers."

The central object of Mr. Higgins' paper is to outline a special school for the training of boys for the grades of mechanics, machinists and engineers. He says that there is great lack of competent mechanics below the grade of mechanical engineers. He says, indeed, that the position hardest to fill now is that of shop foreman. At a recent meeting of managers it was said that 200 young men suitable for foremen for foundries could be placed at once. The man fitted to manage the practical details of a machine shop is a rare man, and his services are in constant demand.

The school which Mr. Higgins proposes would include a commercial machine shop. Pupils would be instructed in this shop half of the working hours of each school week. They would receive in the public schools the instruction equivalent to a high-school course somewhat modified for their special needs. These pupils would be carefully selected, and the whole institution would be managed under practical business men.

He would make the education so progressive that whatever stage the pupil stopped at he would have acquired something valuable, something that would lead him to get a job and to do useful work. He would give every pupil training in drawing and machine design, training the execution of drawings and lettering, familiarity with the shop knowledge which affects the efficiency of a draughtsman and a ready, reliable and precise use of arithmetic. In all cases the machinist's trade would be taught as the basis of any special line of work. Pupils who display executive qualities would have special opportunities. Pupils who show taste and natural abilities for high-grade engineering work would be helped to get the requisite education.

Mr. Higgins had 27 years as Superintendent of the Washburn shops of the Polytechnic Institute of Worcester, and writes from the standpoint of much knowledge and experience. His paper is therefore especially interesting and valuable.

Written discussions of this paper were presented by Rear Admiral George W. Melville, Prof. F. R. Hutton, Mr. H. S. Haines, Prof. John E. Sweet and Dr. R H. Thurston. Each commended in the main the plan as set forth by Mr. Higgins. Dr. Thurston's discussion was particularly valuable and to the point. He gave the views of many men with combined class room and practical experience, and while each looked at the subject from a different standpoint and raised certain objections to the proposed plans, and others could not agree with the author of the paper that such a school training as proposed would take the place of the real apprenticeship system, yet many things were said in favor of the plan of Mr. Higgins.

At the conclusion of Prof. Thurston's paper on Wednesday morning, in which he discussed the steam engine at the end of the nineteenth century, Mr. Charles T. Porter, an honorary member of the Society, gave an interesting account of some work now in progress, which he hopes will be completed by the end of next year. He suggested that Prof. Thurston hold the record open until the end of the century in order that the results of this work may be included among the achievements in steam engineering in the nineteenth century. Mr. Porter proposes to develop 1 h. p. on nine pounds of water per hour. To do this a four-cylinder reciprocating engine will be used working at 300 lbs. pressure. The piston speed will be 1,250 ft. per minute and the revolutions 250 a minute. The stroke will be 30 in. The economy of this engine will result essentially from approaching the ideal thermodynamic conditions.

Thursday.

Mr. F. C. Wagner's paper on "Friction Tests of a Locomotive Slide Valve" * was the first paper dis-

*See last week's issue, pp. 842, 844.

cussed Thursday morning. Objection was made to the conclusion in the paper to the effect that the power of the motor used in the tests was for the most part used up in overcoming the friction of the valve. The power lost in overcoming the inertia did not seem to be properly considered. Mr. Charles T. Porter made the suggestion that we do away with slide valves and use instead piston valves.

The papers of Messrs. A. J. Frith and James McBride were then taken up. As noted last week, the former gave a fly-wheel design and the latter told how a broken fly-wheel was repaired. In the discussion, the point was made that Mr. Frith referred to small fly-wheels, whereas for light wheels the proposed special design seemed unnecessary. For large fly-wheel the Cambria Iron Works had obtained satisfactory results from wheels built from the designs similar to the one by Mr. John Fritz and described at the Washington meeting of the Society. (See Railroad Gazette of May 12, 1899, page 329.) In the discussion, remarks were made on the importance of having not only the best material, but also the best possible workmanship on all fly-wheels.

Gas engine tests were discussed after the reading of Mr. C. H. Robinson's paper in which he gives the results of a test on a 125 h. p. Westinghouse engine. Prof. Thurston said that we may get a relatively low exhaust temperature and a high efficiency, but have so much of the heat carried off in the cooling water that the efficiency of the entire plant, taking into account the heat carried off, will not be as low as it might at first appear. Mr. Edward Rood called attention to the fact that the efficiency of this engine tested was not as low as might be expected, and it might be questioned if a compound condensing engine would not give better results. In a written discussion Prof. Magruder raised some questions as to methods of conducting the tests which were not brought out in the paper and which should be known in order to determine the value of the trials.

The discussion of the next paper on "Strength of Steel Balls," by Mr. J. F. W. Harris, brought out the fact that not much accurate information has been published on the subject. Mr. Henning criticised the results given and presented the results of some careful tests which will be included in the Transactions. The importance of having absolute uniformity and hardness of material if the balls are expected to wear evenly was referred to. Otherwise, the hard ones will wear out quickly.

The concluding paper of the session on Thursday on "Color of Heated Steel at Different Temperatures" raised a somewhat interesting but not very important discussion on the general subject of color-blindness, with special reference to the best methods of determining by sight the temperature of heated steel from the color of the metal.

Friday.

The closing session was held Friday morning. The paper on "Impact," by Mr. W. J. Keep, and the one by Mr. F. H. Stillman on "High Hydrostatic Pressures and Their Application to Compressing Liquids," were read, but the discussion was brief and not important.

The paper by Mr. Walter C. Kerr on "The Mechanical Equipment of the new South Station, Boston," was then presented, and instead of reading the paper, Mr. Kerr outlined briefly the features of exceptional engineering interest in the construction of the terminal. This important work has been referred to so many times in our columns that an account here seems unnecessary.* In the discussion, Westinghouse, Church, Kerr & Co., who superintended practically all the engineering work, were commended for the creditable way in which the work was done. It was remarked that in this country engineers actually do the work of designing for which they receive no pay and must necessarily charge a higher price for the contract jobs which they get to make up for the loss through designs which bring them no returns. In closing the discussion, Mr. Kerr expressed some notions about the principle which should govern engineering work. He highly commended the straightforward, honest work of engineering firms, believing that "freak things do not work."

"The Value of a Horse-Power," by Geo. I. Rockwood was the last paper taken up. This paper considers the question, What is a horse-power worth? The city of Worcester and the owners of developed water privileges, which claimed they had been deprived of some of the water power of the Blackstone River, which supplied the power, had to settle this question before a Board of Arbitration last year. It was found impossible for the city officials and the mill owners to agree on a fair compensation for the loss of water at the 80 privileges along the Blackstone River. The case was tried before a commission of three judges appointed as a Board of Arbitration. The commission gave its decision on June 28 last, and a settlement was effected between the city and petitioners amounting to $500,000 with interest for four years at 6 per cent. Prominent engineers testified pro and con on the value of a horse-power, the testimony requiring 50 days. Unfortunately, the opinion rendered by the commissioners contains nothing of importance to those engineers who have to appraise water power privileges and in this respect is unworthy of the importance given to the trial. It did result, however, in bringing out considerable discussion on this mooted question. Mr. William Kent said that the market value of a horse-power is "what a man is willing to sell a horse-power for to a man willing to buy." In this particular case he said it was about $50 per horse-power per year.

Mr. Rockwood's paper was discussed by Dr. Thurston, Mr. Kent and others. The former presented a written discussion, giving some additional considerations of this question, which he regarded as an important one. Mr. Kent followed with remarks which were mainly a defence of Mr. Rockwood's statements to the effect that Mr. Kent's testimony was incomplete. He attacked forcibly Mr. Rockwood's position that the horse-power had no commercial value, which, to Mr. Kent and the petitioners, was a new view and one that could hardly be successfully defended.

*See Railroad Gazette, May 6, and Sept 30, 1897; Jan. 1 and 8 and July 9, 1898, and May 12, July 21, Nov. 10, and Dec. 1, 1899

The New Terminal Station of the Pittsburgh & Lake Erie.

The Pittsburgh & Lake Erie Railroad has let to Messrs. Westinghouse, Church, Kerr & Co., the contract for a new terminal station in Pittsburgh, which will cover a considerable area alongside the present station on the bank of the Monongahela River. It is convenient to the Smithfield street bridge over the Monongahela and several lines of electric cars connect with the Pittsburgh and the Allegheny street car systems. This is a part of important improvements which the company is carrying out. The shops and yards at McKees Rocks are to be rebuilt at a cost of about $500,000. The road is being widened for four tracks from Pittsburgh to Coraopolis, about 14 miles.

The entire contract for the new terminal station has been placed with Westinghouse, Church, Kerr & Co., as was the contract for the Boston terminal station. This company designs and builds everything under the general specifications and direction of Col. J. N. Schoonmaker, Vice-President and General Manager, and Mr. J. A. Atwood, Chief Engineer of the Pittsburgh & Lake Erie. The contract includes a power house equipment, a wiring for electric arc and incandescent lighting, elevators for passenger, freight and dumb waiter service; heating and ventilating the head house and other buildings; a plant for filtering, purifying, and mechanically cooling drinking water; a system for heating cars in the train shed and coach yard; apparatus for furnishing compressed air for car cleaning, train brake and signal testing, etc.; means for fire protection; a pumping plant for disposing of drainage water; a system for the general supply of hot and cold water for the terminal and office buildings.

In the power house the boilers will be of the water tube type, each being equipped with a Roney mechanical stoker and smokeless furnace. Coal and ash handling machinery, having a capacity of about 35 tons of coal per hour, will be provided in the boiler house. A self-supported steel stack, lined with brick, will furnish draft for the furnaces, and will be of sufficient size for providing draft for additional boilers when installed. The engine equipment will consist of five 14 x 24 x 14 Westinghouse single valve, compound automatic engines, to be operated noncondensing with steam at 125 lbs. pressure, and will be provided with single weight inertia governors. Each engine will be direct connected to a 120 k. w. Westinghouse multipolar direct current "engine type" generator, delivering current at 125 volts. Each of the engines with its generator will be mounted upon a heavy cast iron bed plate. The steam piping of the power house has been designed with a view of securing freedom from strains due to expansion or contraction, and a system of separators and steam loops will return entrained water automatically to the boilers. Provisions will be made for treating and purifying the water for feeding the boilers. The power house will have an overhead traveling crane of sufficient capacity to handle all parts of the engine room machinery.

The electric wiring installation has been so designed that the operator at the main switchboard may control every part of the system. Local distributing centers will be connected with the switchboard by two wire feeders. Pressure wires and an annunciator system connect the power house with the distributing centers, and are so arranged that cooperation is secured between the local operators in the various departments, and the power house attendants. The entire lighting installation will comprise about 3,700 incandescent and 70 arc lamps.

The elevators will be operated electrically, supplied with power from the same bus-bars as supply current for the lighting system. There will be two passenger elevators, and one for freight service, and two dumb waiters.

Fresh air will be provided, tempered to 70 degrees, for the rooms in the head house which are regularly occupied, with a change of air every fifteen minutes. The main waiting room will be warmed wholly by indirect radiation. Exhaust ventilation, in addition to the fresh air supply, is secured by two exhaust fans, placed in the upper part of the building, one of which will exhaust the vitiated air from the offices, and the other from all the lavatories. In addition there will be a third exhaust fan in the basement to remove foul air from the main waiting and first floor rooms. The lavatories will be provided with an entirely separate set of ducts, connected with a separate fan. No air will be supplied directly to the lavatories, the air movement being from the surrounding rooms toward fixtures, and through fixture vents to the duct system, through which the air will be discharged above the roof, thus greatly improving the sanitary condition of rooms that in railroad stations are often very objectionable.

The exhaust steam from the engines in the power house will be used for supplying heat. Water, heated by this steam, will convey the heat to the direct and indirect radiators. Provision will be made for filtering and purifying the air before being distributed to the buildings, and for furnishing cool air to the offices during warm weather.

Great care will be taken with the drinking water distribution. A plant will furnish cooled drinking water to some 40 or 50 outlets in various parts of the building. It will be distilled, filtered and chilled in cypress tanks by means of submerged direct expansion ammonia coils. This chilled water will be pumped through pipe circuits to the water taps in the offices and corridors on the various floors. The distributing system is so arranged that the chilled water will continuously circulate close to the outlets, thereby providing a cooled supply without unnecessary waste at the faucets. This plant will have a capacity for cooling 1,500 gallons per twenty-four hours to 40 deg. F. The pipes of the circulating system will be covered with non-conducting material to reduce the loss through radiation, and to prevent the condensation of moisture on the piping.

To heat cars in the station steam will be taken from the power house, and facilities will be provided for warming thirty cars simultaneously.

Compressed air will be furnished for various purposes. It will be supplied from a steam driven air compressor and from a small air pump in the main power house, distributed through pipe systems connected with apparatus for car cleaning, air brake and train signal testing, a pneumatic tube service, and for an interlocking switch and signal system. The total rated capacity of the two compressors will be 531 cu. ft. of free air per minute, and a large reservoir capacity will be installed to provide a liberal air storage.

An electrically driven centrifugal pump will be installed for freeing the sump well which will be built in the power house to catch the seepage or other water which may find its way to the well through a system of drains to be provided for the purpose. The pump will have a capacity of 1,000 gallons of water per minute, against a head of 23 ft.

The general supply of water will be provided from a well to be built near the power house. The water will be delivered by a pump with a capacity of 225 gallons per minute, and will be distributed for feeding the boilers, for the drinking water system, for a general supply to the head house, and for providing heating water to sinks, bowls, etc. The heating plant for the hot water is placed in the basement, and will have a nominal capacity of 400 gallons per hour, heated to 212 deg. F., the heat being supplied through copper coils in the heater connected with the live steam system; the amount of steam being regulated to maintain any desired temperature by an automatic thermostat valve. Hot water will be provided at 73 outlets in the head house. The main supply pump will be connected with a double system of piping buried in the railroad yard, and through this system to a proposed storage tank of some 100,000 to 200,000 gallons capacity.

Train Accidents in the United States in October.

COLLISIONS.

Rear.

1st, on Terminal Railroad, at St. Louis, Mo., a passenger train of the Wabash road which had been unexpectedly stopped on a descending grade approaching the Union Station, was run into at the rear by a following passenger train of the Burlington road, damaging the engine and one car. The engineman and one passenger were injured.

2d, 4 a. m., on Lehigh Valley, near Newmarket, N. J., a freight train which had been unexpectedly stopped was run into at the rear by a following freight and the engine and several cars were ditched. The engineman of the second train, who was killed, is believed to have been asleep, as a flagman tried unavailingly to attract his attention with a red signal and by shouting.

3d, on St. Louis, Iron Mountain & Southern, near Traskwood, Ark., a freight train broke in two and soon afterward the forward portion separated between the seventh and eighth cars. These were quickly stopped by the automatic action of the air brakes and the rear portion ran into them, wrecking five cars. A man riding in one of the cars was killed.

6th, on Pennsylvania road, near South Fork, Pa., a freight train ran into the rear of a preceding freight, wrecking a caboose. A trainman was killed.

6th, on Maine Central, near Newport, Me., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, wrecking several cars. The conductor was injured.

7th, on Chicago & Northwestern, at Snells, Wis., a passenger train ran into the rear of a preceding freight, wrecking the engine, caboose and three freight cars. The wreck took fire and was mostly

burned up. Two trainmen and three passengers were injured. There was a dense fog at the time.

8th, on Erie road, near Corry, Pa., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, wrecking 15 cars. Two tramps were injured.

9th, on Pittsburgh, Ft. Wayne & Chicago, near Etna Green, Ind., a freight train which had been stopped by the rupture of an air brake hose was run into at the rear by a following freight, and the engine and 15 cars were wrecked. The fireman was injured.

10th, on Philadelphia & Reading, near Norristown, Pa., rear collision of freight trains; one trainman injured.

10th, on Philadelphia & Reading, at Lebanon, Pa., a passenger train ran into the rear of a preceding freight and the caboose and one freight car were wrecked. The rear brakeman of the freight was asleep in the caboose and was seriously injured. There was a dense fog at the time.

11th, on Illinois Central, near Storm Lake, Ia., a freight train which had been unexpectedly stopped was run into at the rear by a following gravel train, damaging several cars. The conductor of the gravel train was killed.

14th, 1 a. m., on Pittsburgh & Western, at McKims, Pa., a freight train ran into the rear of a preceding freight, and the engine and eight cars were wrecked. Two trainmen were injured. There was a dense fog at the time.

16th, on Union Pacific, near Granite Canyon, Wyo., an eastbound fast mail train ran into the rear of a preceding freight, making a bad wreck. Two drovers in the caboose of the freight were killed and two drovers and one trainman were injured.

17th, on Wabash road, near Ritchie, Ill., a freight train ran into the rear of a preceding freight, wrecking the engine, caboose and four freight cars. The engineman was killed.

18th, on Illinois Central, at Wilderman, Ill., a freight train ran into the rear of a preceding freight, wrecking the engine and 15 cars. The engineman was injured.

21st, on St. Louis, Iron Mountain & Southern, at Neeleyville, Mo., a passenger train ran over a misplaced switch and into some freight cars standing on a side track, wrecking the engine, mail car, one passenger car and three freight cars. Two men were working in the cars on the side track; one of them was killed and the other badly injured. Several passengers and a track laborer were also injured.

22nd, on Oregon Short Line, near Farmington, Utah, a freight train ran into the rear of a preceding freight, at or near a water station, and the engine and eight cars were wrecked. The engineman and fireman were injured.

23rd, on Maine Central, At Iceboro, Me., a freight train broke in two and the rear portion afterward ran into the forward one, wrecking 10 cars. The wreck took fire from matches in one of the cars and was mostly burned up.

24th, on Pennsylvania road, at Hillside, Pa., a freight train which had stopped to take water was run into at the rear by a following freight, and the caboose and six cars were wrecked. A tramp was killed.

24th, on Illinois Central, near Brookhaven, Miss., a freight train ran into the rear of a preceding freight. It is said that the foremost train was running 20 miles an hour when struck. The conductor jumped off and was injured.

24th, on Baltimore & Ohio, at Meyersdale, Pa., eastbound passenger train No. 6 ran over a misplaced switch and into a freight car standing on a side track. Two passengers were injured.

25th, on Fitchburg road, at Royalston, Mass., a freight train ran into the rear of a preceding freight, damaging several cars. Three trainmen were injured.

25th, on Wabash road, at 16th street, Chicago, a freight train ran into the rear of a preceding freight, damaging several cars. One engineman was injured.

26th, on Plant System, at Valdosta, Ga., a westbound passenger train ran over a misplaced switch and into some freight cars standing on a side track, wrecking the baggage and mail cars. Two passenger cars were overturned, "but not a soul received a scratch." One account states that the switch was defective.

27th, on Pennsylvania Lines, at Arcola, Ind., a local freight standing at the station was run into at the rear by a following freight, derailing three cars and damaging the engine. The engineman and fireman were injured.

27th, on Lehigh Valley road, near Tunkhannock, Pa., a freight train broke in two near the middle, in consequence, it is said, of steam being applied too suddenly by the engineman; and, the forward part being stopped by the automatic application of the air brakes, the rear portion ran into it, derailing seven cars, two of which were wrecked. The conductor was injured.

28th, 2 a. m., on Pennsylvania road, at Sunbury, Pa., eastbound passenger train No. 4 ran into the rear of a freight train, wrecking several cars of oil and flour. The engineman and one brakeman were injured.

28th, on Bangor & Aroostook, at Milo Junction, Me., a locomotive ran into the rear of a preceding freight train, damaging the caboose. A brakeman was killed. It is said that a flagman failed to do his duty.

29th, 2 a. m., on Norfolk & Western, near Wytheville, Va., a freight train which had stopped to take on a car was run into at the rear by a following freight and the caboose and seven cars were wrecked. The wreck took fire and was mostly burned up. A station agent riding in the caboose was killed.

29th, 10 p. m., on Delaware, Lackawanna & Western, at Hoboken, N. J., an eastbound passenger train ran into the rear of a preceding milk train standing in the station, wrecking one car. Two trainmen were injured.

30th, on Delaware, Lackawanna & Western, at Fargo, N. Y., a freight train ran into the rear of a preceding freight, wrecking the caboose and one car and damaging the engine and 15 cars. The engineman and fireman were injured.

31st, 1 a. m., on Louisville & Nashville, near Crofton, Ky., a freight train ran into some cars which had run back from a preceding freight train, wrecking the engine and 18 loaded cars. An oil tank car exploded and the wreck was mostly burned up. Six trainmen were injured.

31st, on Pennsylvania road, at Collins, Pa., a freight train ran into the rear of a preceding freight, wrecking the engine and 15 cars. The engineman was injured.

31st, on New York Central & Hudson River, near Spencerport, N. Y., a freight train was run into at the rear by a following freight, wrecking six cars. The caboose was damaged by fire and two trainmen were injured. There was a dense fog at the time. A passenger train was passing on the adjoining track just as the collision occurred and the passenger cars were badly damaged. The baggage car caught fire from the burning caboose.

And 30 others on 19 roads, involving 6 passenger and 44 freight and other trains.

Butting.

2nd, 2 a. m., on Southern Pacific, at Crow's Landing, Cal., a freight train ran over a misplaced switch and into the head of another freight standing on the side track, and both engines and several cars were badly damaged. The wreck took fire and 15 loaded cars, with their contents, and a warehouse containing 4,000 sacks of grain, were burned up. A tramp who was stealing a ride was injured.

2nd, on Louisville & Nashville, at Cincinnati, O., butting collision of locomotives, badly damaging both engines. A brakeman was killed and the engineman injured.

5th, on Delaware & Hudson, near Putnam, N. Y., collision between a passenger train and a freight, ditching both engines and damaging several cars. Six passengers were injured.

7th, on Illinois Central, near Hawthorne, Ill., butting collision of special passenger trains, one of which was empty, badly damaging both engines and one car. Four passengers and one engineman were injured.

8th, on Fremont, Elkhorn & Missouri Valley, at Arlington, Neb., butting collision between a passenger train and a freight, badly damaging the baggage and smoking cars; one fireman injured.

11th, on Pittsburgh, Cincinnati, Chicago & St. Louis, near Short Creek, W. Va., butting collision between a regular and a special passenger train, damaging the engines and several cars. Six trainmen and two passengers were injured, one of the former fatally.

14th, on Pittsburgh, Cincinnati, Chicago & St. Louis, near Westville, O., butting collision of freight trains, both running at considerable speed. A brakeman was killed. It is said that one of the enginemen made a mistake in identifying the train which he was ordered to meet at Westville.

19th, on Minneapolis, St. Paul & Sault Ste. Marie, at Rockford, Minn., a westbound passenger train ran over a misplaced switch and into the head of an eastbound freight train standing on a side track; one trainman injured.

20th, on New York, New Haven & Hartford, near Fishkill, N. Y., butting collision between a freight and a special train, badly damaging the engines and several cars. One trainman was fatally injured.

21st, on Illinois Central, at Goodman, Miss., collision between a passenger train and a freight; one trainman injured.

23rd, on Cleveland, Cincinnati, Chicago & St. Louis, at Brookfield, Ind., an eastbound freight train moving at good speed ran over a misplaced switch and into the head of a westbound freight standing on the side track, wrecking both engines and 10 loaded freight cars. One fireman jumped off and was injured.

25th, on Buffalo, Rochester & Pittsburgh, near Hardy's, N. Y., butting collision of freight trains, badly damaging both engines and six cars. Three trainmen were injured. The collision is said to have been due to disregard of telegraphic orders by the eastbound train.

26th, on Pittsburgh & Western, at Undercliff, Pa., butting collision between a passenger train and a freight, damaging both engines and several freight cars. Four trainmen were injured. There was a dense fog at the time.

27th, on Baltimore & Ohio, near Cassell's, O., butting collision of freight trains, wrecking both engines and nine cars. The wreck took fire and six care were burned up. One engineman was fatally injured. The trains were ordered to meet at Cassell's but the conductor and engineman of train 25 read "New Concord" instead of Cassell's.

And 15 others on 15 roads, involving 3 passenger and 27 freight and other trains.

Crossing and Miscellaneous.

1st, on Philadelphia & Reading, near Williamsport, Pa., collision of freight trains; conductor fatally injured. A part of the wreck took fire and was burned up.

3rd, 1 a. m., on Southern Pacific, near Sour Lake, Tex., a freight train broke in two and the forward part, when setting back, collided with the rear portion violently, wrecking two cars and killing a brakeman. Two other trainmen and a tramp were injured.

4th, on Central of New Jersey, near Dunellen, N. J., an empty engine ran over a misplaced switch and collided with some coal cars, and five cars were damaged. The fireman jumped off and was injured.

5th, 8 p. m., on Baltimore & Ohio, near Elm Grove, W. Va., two tank cars broke away from a freight train and ran back down grade several miles and collided with a freight train, wrecking 12 cars and one locomotive. Three trainmen were injured.

6th, on Louisville & Nashville, at Edgefield Junction, Ky., collision of freight trains, due to a misplaced switch; conductor injured.

7th, on Wabash road, at Blue Mound, Ill., a passenger train ran into a freight, switching on the main track, and several cars were wrecked; engineman and fireman injured.

8th, 12:30 a. m., on Fitchburg road, at Hoosick Junction, N. Y., collision between a passenger train and a freight, injuring the conductor of the passenger train. A passenger jumped off and landed on some rocks in the Hoosick River and was killed.

9th, 3 a. m., on New York Central & Hudson River, at Schuyler Junction, N. Y., collision of freight trains at a crossover, injuring a brakeman.

10th, on Delaware, Lackawanna & Western, near Stroudsburg, Pa., a freight train ran into an empty engine, doing slight damage. The engineman and fireman of the empty engine were on the ground at the time, and the engine ran down grade 20 miles unattended, but stopped without doing any damage.

10th, on Philadelphia & Reading, near Myerstown, Pa., a freight train broke apart in two places and the first section, in setting back, was not properly controlled and ran into the middle section. A trainman was injured.

10th, on Philadelphia & Reading, at Hellertown, Pa., a freight train that was being backed into a side track was run into by a passenger train, and the engine and several freight cars were wrecked. The freight cars and the caboose took fire and were burned up.

10th, 9 p. m., on Toledo & Ohio Central, at Findlay, O., a passenger train of the Cleveland, Cincinnati, Chicago & St. Louis, which was being backed over a Y track for the purpose of being turned, ran over a misplaced switch and into the front of another passenger train. One passenger car was overturned in the ditch, and one trainman was injured.

11th, 10 p. m., on New York, Ontario & Western, at Cornwall, N. Y., a passenger train entering a side track ran into a platform car on which was a hook and ladder company. Six freight cars were damaged and one of the men on the platform car was injured.

12th, 5 a. m., on Toledo & Ohio Central, at Sycamore, O., a southbound freight train entering a side track was run into by a northbound freight drawn by two engines and both engines and 20 cars were wrecked. Two trainmen were injured.

12th, on West Jersey & Seashore, at Glassboro, N. J., collision between a work train and a freight, due to a misplaced switch; two employees injured.

12th, on Southern Pacific, near Chaney Junction, Tex., collision between a passenger train of the San Antonio & Aransas Pass and one of the Southern Pacific.

13th, on Norfolk & Western, at Ironton, O., collision between a local freight and a switching freight, badly damaging one of the engines. There was a dense fog at the time. A man riding on the yard engine was killed.

14th, on Central of New Jersey, at Whitehouse, N. J., a passenger train of the Rockaway Valley road, standing on the main track, was run into by a train of the Central of New Jersey, damaging one engine and five cars. One trainman was injured.

15th, 1 a. m., on Delaware, Lackawanna & Western, near Summit, N. J., collision between a passenger train and an empty engine, badly damaging both engines. One trainman was injured. There was a dense fog at the time.

23rd, on Wabash road, near Wabash, Ind., 13 cars broke away from a freight train and ran back down grade some distance and collided with a following freight, making a bad wreck. A new engineman learning the road was killed and the fireman was fatally injured. Two other trainmen were injured.

25th, on Philadelphia & Reading, near Conshohocken, Pa., collision of freight trains, damaging both engines and several cars. One of the engines fell down a bank. Two trainmen were injured.

25th, on Pittsburgh, Cincinnati, Chicago & St. Louis, near Wheeling, W. Va., collision of freight trains, damaging both engines; three trainmen injured. There was a dense fog at the time.

26th, on Pittsburgh, Cincinnati, Chicago & St. Louis, at Pittsburgh, Pa., collision of locomotives; one engineman injured.

28th, on Union Pacific, near Laramie, Wyo., eight cars broke away from the rear of a gravel train and collided with a locomotive, making a bad wreck, which took fire and was partly burned up. The fireman was killed and the engineman and conductor were injured.

And 48 others on 34 roads, involving 11 passenger and 77 freight and other trains.

DERAILMENTS.

Defects of Road.

6th, on Wisconsin Central, near Thorpe, Wis., passenger train No. 1 was derailed, it is thought by a loose rail, and four passenger cars were ditched. One passenger was fatally injured and 15 others were hurt, most of them not seriously.

17th, on Great Northern, near Graceville, Minn., a mixed train was derailed and the engine was overturned in the ditch. The engineman, fireman and roadmaster were injured. Two of the State Railroad Commissioners were on the train going over the road to investigate the facts connected with a complaint that the track was not kept in safe condition.

30th, on Yazoo & Mississippi Valley, near New Orleans, La., three cars of a passenger train were derailed by a defective rail joint; nine passengers were injured.

30th, on Pittsburgh & Western, at Carbon, Pa., eastbound passenger train No. 6 was derailed on a side track by a loose rail; three trainmen injured, one of them fatally.

And 7 others on 7 roads, involving 1 passenger train and 6 freight and other trains.

Defects of Equipment.

10th, 4 a. m., on Cincinnati, New Orleans & Texas Pacific, at Nemo, Tenn., a freight train was derailed by the breaking of a wheel of the tender, and 17 cars were wrecked. A tramp was killed.

11th, on Western New York & Pennsylvania, near Kinzua, Pa., seven cars of a freight train were derailed by a brake beam which was broken and fell upon the track. A brakeman was killed.

18th, on New York Central & Hudson River, at Indian Castle, N. Y., two sleeping cars in a passenger train were derailed by a drawbar which was pulled out and fell upon the track. One car fell down a bank, and one passenger was slightly injured.

19th, on Southern Railway, at Wrens, Ga., a mixed train was derailed by the breaking of the flange of one of the forward truck wheels of the engine, and the engine and four cars fell into a creek. The engineman and fireman were fatally injured.

19th, on Norfolk & Western, at Stoneville, N. C., a freight train was derailed by a brake beam which broke and fell on the track, and 18 cars were wrecked. A brakeman and two tramps were killed.

23rd, on Columbus, Sandusky & Hocking, near Shepard's, O., a freight train was derailed by the breaking of a driving wheel, and several cars were wrecked. A brakeman was injured.

23rd, on Pennsylvania road, at Wilmore, Pa., a freight train was derailed by the breaking of a driving wheel tire and nine loaded cars were wrecked. A brakeman was injured.

24th, on Nashville, Chattanooga & St. Louis, near Bell Factory, Ala., a mixed train was derailed by a drawbar which was pulled out and fell upon the

(*Continued on page 864.*)

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to improvements. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

The Trunk Lines and their western connections appear to have agreed on changes in classification which will advance freight rates January 1 on about 500 commodities, and the reports telling how the railroads are going to get a share of the prosperity that is now being picked up almost everywhere will be repeated with renewed emphasis; and yet the increase in receipts will probably be very moderate. Indeed, when computed as a percentage on the total freight receipts of any road, it will doubtless be very small. The fact is that half a dozen commodities will represent nearly or quite all of the increase that will be visible, even to the traffic manager, in the total receipts. Sugar, coffee and soap in carloads are each advanced five cents (New York to Chicago). These move west in large quantities and the income from them is considerable. Coffee and soap are also advanced (15 cents) when in less than carloads. Cotton piece goods are advanced (15 cents) from third class to second, and cottons in first class are reduced 10 cents to second so as to put all cottons in the same class. This bit of charity will cover a multitude of sins, for the cotton-piece-goods tariff has been the occasion of a prodigious amount of cheating in the description of goods in shipping orders. When we have considered the foregoing articles the list of increases which are important to the railroads has been finished. We do not say that the railroads despise the small increases which may come from other changes; but it is, we believe, fair to say, that a principal element in the reason for making the changes has been simply a desire to restore these commodities to their normal classes. For the past ten years, and particularly during the past six years, powerful influences have been at work pulling down the rates of one commodity after another. As one industry after another felt the pinch of hard times the railroads were importuned to reduce transportation charges, in order to save some particular factory or city from commercial death; and as a shrinkage of manufacturing would mean a loss to the railroad serving that factory, the importunities were yielded to. But in doing this the classification has been badly torn to pieces. Articles which had, presumably, been equitably classed, according to their value, the value of the transportation and the volume of goods moved, when compared with values and volume of other freight, were arbitrarily taken out of their class, and put into a lower one, under stress of unfavorable trade conditions. It is a plain duty to repair such mutilations of the classification as soon as possible.

But every one of the 500 changes will affect some shipper's pocket, and however small a man's interest, as compared with the total amount of money involved in the change effected by the advances as a whole, he can, of course, make a very loud complaint; and it appears that enough such complaints have already reached Washington to induce the Interstate Commerce Commission to investigate. A hearing on the new classification is to be held at Washington next Thursday. We judge that such a hearing, if the facts are properly set forth, ought to be beneficial all around. Every report, in the newspapers or elsewhere, concerning the increased business prosperity of the last few months says that it is shared in by all classes. If this is so, practically all shippers must be enjoying an increased income beside which an increase in transportation charges is too small to count. We do not make this statement merely as a figure of speech, to set off our argument, for, it must be remembered, those commodities of which the cost of transportation is a large element in their total value are not affected by the present changes. If the Commission shall find, and shall declare, that the advances are justified and that the new rates are in the main equitable, as compared with other rates which have not been changed, the fact should help to give stability to the new rates. The press dispatch which tells of the proposed hearing before the Commission says that it appears from the new classification "that existing differences in classification between carload and less than carload quantities of freight will be considerably increased." This refers, we suppose, to cases like that of coffee, where carloads are increased five cents (25 to 30) and smaller lots fifteen (35 to 50). While we are not set to defend the Classification Committee, we will venture the suggestion that this course was pursued because of the great love for uniform classification that animates the breasts of the members of the Committee. They could not have advanced the 35-cent rate less than 15 cents without introducing a new class; and to do that would disturb prices at a thousand places on numberless commodities. The purpose not to complicate classes was a laudable one, and the members of the Interstate Commerce Commission, as the apostles of uniform classification, will be bound to approve the Committee's endeavors! Quite likely sugar, on which the difference between C. L. and L. C. L. rates is reduced instead of increased, is a more important commodity in this particular than all the others combined.

The Commission, indeed, will have a fine opportunity to set forth, for the benefit of the public, some of the principles and the difficulties which have to be dealt with in making a general tariff and classification. There can be little doubt that what the railroads have now done has been done with an intelligent purpose to avoid all discrimination and injustice; and yet individual shipping interests may undoubtedly have been unfavorably affected. But in view of the utter impossibility of adhering to any precise rules in adjusting to one another the rates on hundreds of different commodities, the safest practicable rule is that of precedent; and on this point the Committee has, we understand, put itself in a strong position. The changes are nearly all restorations to places which the specified commodities had occupied for many years and to which they had been originally assigned when rates were made more according to reason and less according to crazy competition than in these degenerate days. As to the total amount of the increase which the traffic managers propose to make to their incomes, we think that they are very moderate. To the disinterested observer there appears to be no reason why there should not be a "horizontal advance" in all freight rates, especially on long distance carriage, such as the Trunk Line classification deals with. Every shipper admits that with the increasing profits now enjoyed by manufacturers and merchants everywhere, the carriers are entitled to better compensation. On the great majority of the merchandise shipments (that is, excluding grain, coal, iron and the few other commodities in which transportation makes up a large share of their value) an increase of 50 per cent. would make scarcely a perceptible difference to the consumer; and on many an increase of 100 per cent. would never be felt after the change had been in force for six months.

Defects in Coupler Unlocking Gear.

We have just received from the Interstate Commerce Commission a document of remarkable interest, and we should advise railroad men to send to the Secretary of the Commission and get it. It is entitled, "Report of the Condition of Safety Appliances and the Defects in the same upon Freight Cars examined since October 8, 1899." The Commission employs an inspector whose duties are to travel about the country and observe and report on defects in safety appliances. The pamphlet in question is a record of certain things that he saw in freight yards from Rochester, N. Y., to Chattanooga, Chicago and St. Paul, covering the middle West pretty well. The dates of the various reports begin Oct. 10 and end Dec. 1.

These reports now considered are confined to defects in the locking gear, or more accurately, in the unlocking gear. We shall give below a tabulation showing the number of cars reported on and classifying the defects. The total of defects observed is greater than the total cars, as two or more defects were sometimes seen on one car. Obviously, these defects could be looked for or seen in only a very small percentage of the cars which were in the yards at the time. The inspector says, "when inspected the cars are generally in strings or made up in trains coupled up, making it impossible to give each coupler a thorough examination. Only the cars at the ends can therefore be thoroughly examined, as it would not be allowable to uncouple the cars in other portions of the train for the purpose of examination. Defects reported are largely those which can be noticed in passing by." The inspector is "positive that he only gets a small proportion of the defective couplers, but enough to show the great neglect in repairs."

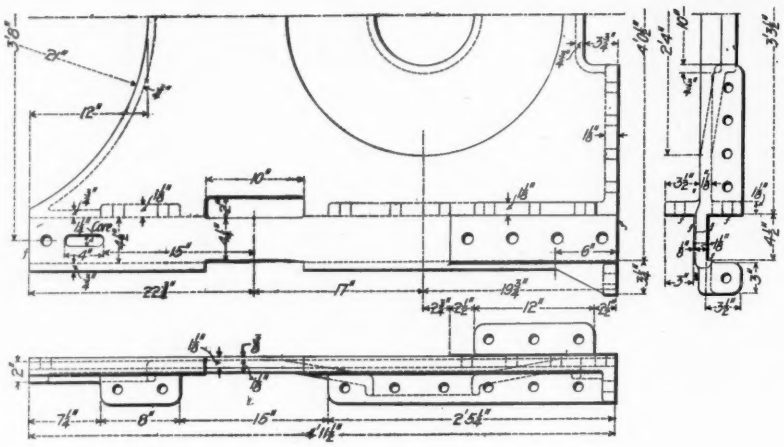
In the tabulation below we adopt a maker's nomenclature in which the uncoupling lever is the part which this inspector calls a pin lifter, or a pin lifter rod, or a pin puller; and uncoupling lever chain is the connection between the uncoupling lever and the pin, whether that may be a chain, or a single link or a link and two clevises, or other arrangement.

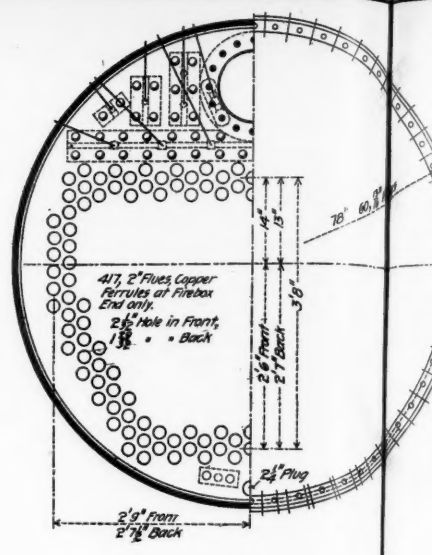
It is obvious that this report cannot give anything more than a general notion of the percentage of the cars on which the uncoupling gear was out of order, but it indicates what the inspector would have found if he could have examined each car. It will be seen that even in this superficial and incomplete examination the inspector found 1,264 cars in which the unlocking gear was so defective that the men working in the yards were put to inconvenience and subjected to actual danger. That this condition is very extensive nobody who is at all familiar with the situation will doubt. How extensive it is probably few people realize. We are told by a gentleman who has recently examined a careful, detailed report on coupler defects at certain great yards that 95 per cent. at least of these defects were in the unlocking gear, and he ventures the guess that this part of the coupler gear is defective in perhaps 75 per cent. of the cars running.

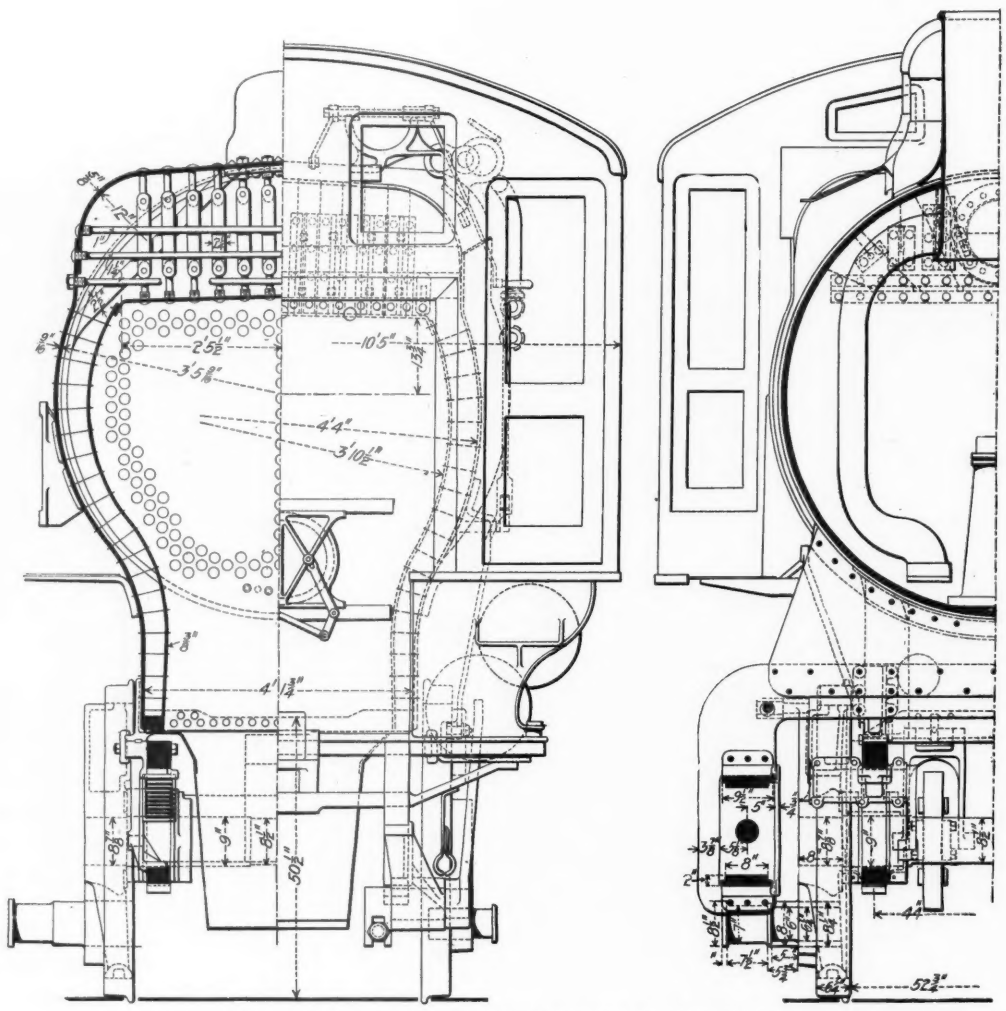
One result of this condition is a demand upon inventors for additional contrivances in the nature, for example, of a lock-set within the coupler head. But it seems obvious that there are already enough parts about the coupler rigging and that any further invention, if any is needed, should be in the direction of simplification. It is obvious, further, that it is a mistake to try to transfer any function from the exterior, visible and easily accessible unlocking gear to the inside of the coupling head. This at once adds to the difficulty of inspection and of repair, and in fact makes inspection impossible during a good deal of the yard work. Furthermore, it does not fill the bill by keeping men from going between the cars, for it is inoperative if the uncoupling chain is broken, and it does not leave the coupler set open during yard work.

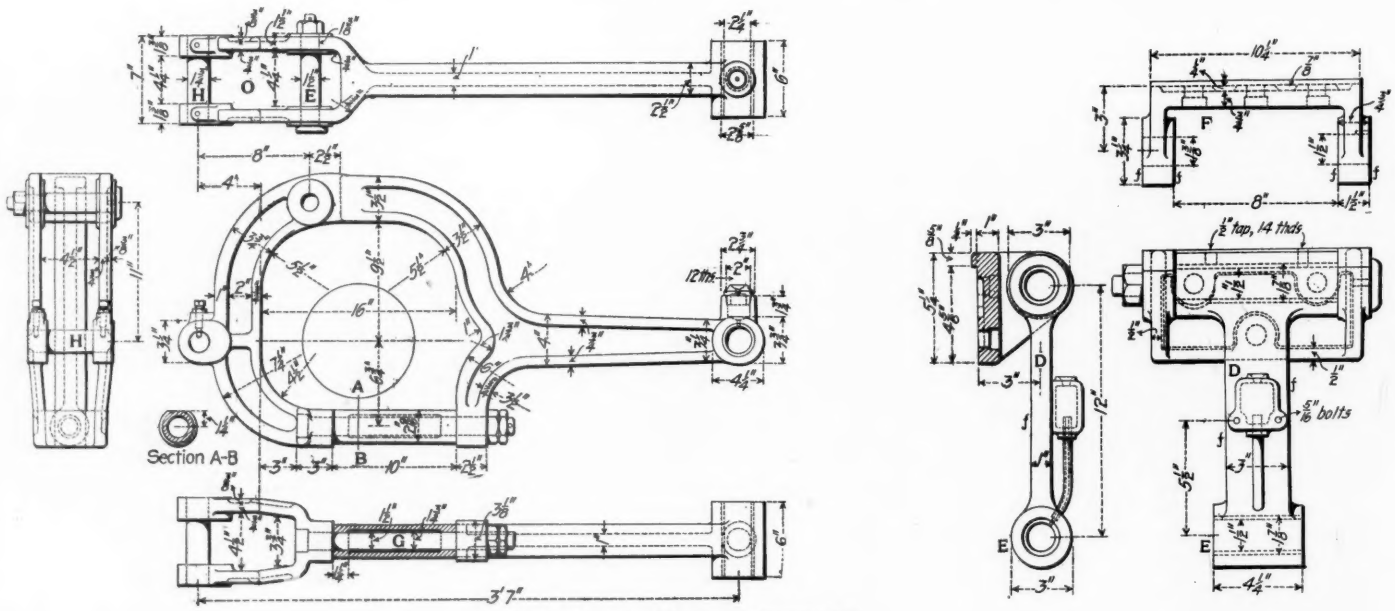
If one will look at the little table below he will see that the trouble is not for want of more parts to keep in order. For instance, on the 1,264 cars the chain was broken in 513 cars and too long in 59 cases. No new contrivance would help these. In 227 instances the lever handle was so close to the car that it could not be worked, or could only be worked at the cost of injury to the hand of the operator. No new part is going to help these cases; nor would it help matters if the lever were gone, or hanging loose from the sill, or, in short, in any one of the 1,347 cases, so far as we can see.

In fact, the lesson from this report seems to be that the burden is on the railroad companies to see that their unlocking gear is, in the first place, properly put on and, in the second place, kept in good order. The unlocking gear does not appear to be weak in design or in make-up; but it does often happen that the keepers for the uncoupling lever are not properly fastened to the end sills, and that the defects in the way of broken chains, bent rods and loose keepers are not discovered, or if discovered, are not corrected. If the levers are fastened by driven lag screws instead of by bolts, naturally they are bound to work loose, just as grab irons do; and then some one gets hurt or killed. Rather than hold a train fifteen minutes in a busy yard for a slight repair to the unlocking gear, the defect is









THE 108-TON CONSOLIDATION LOCOMOTIVE FOR THE ILLINOIS CEN

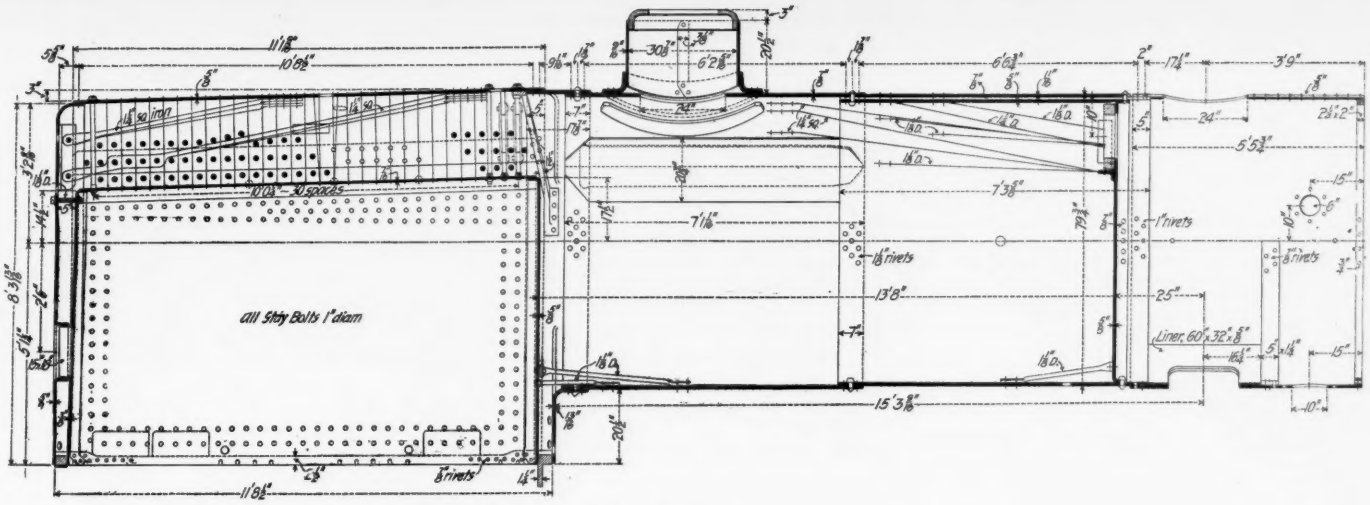


Fig. 2 —Details of Boiler, Showing Tubes, Bracing and Firebox.

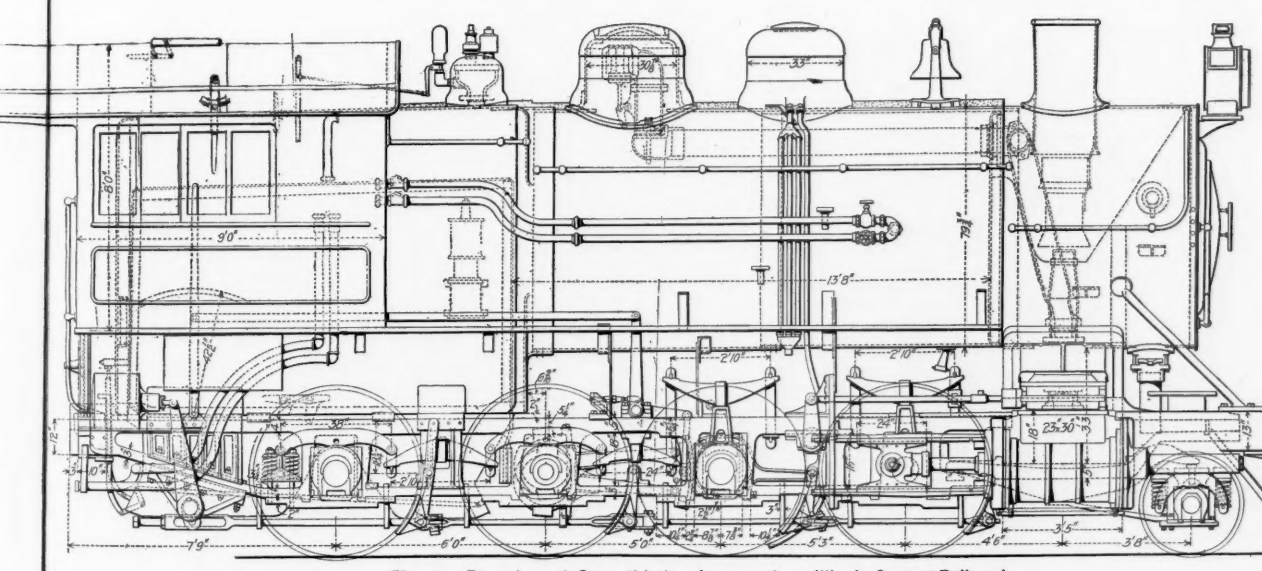


Fig. 1.—Elevation of Consolidation Locomotive—Illinois Central Railroad.

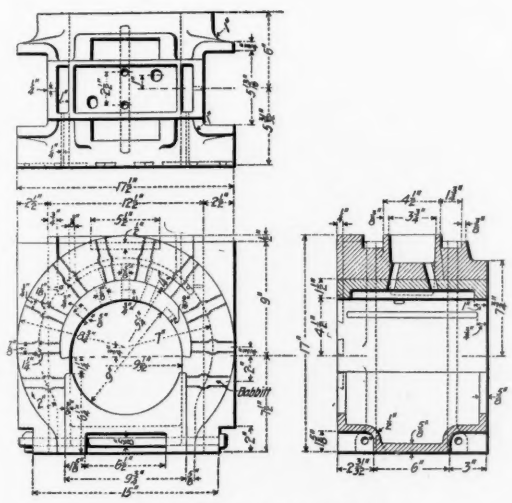


Fig. 5.—Steel Driving Box.

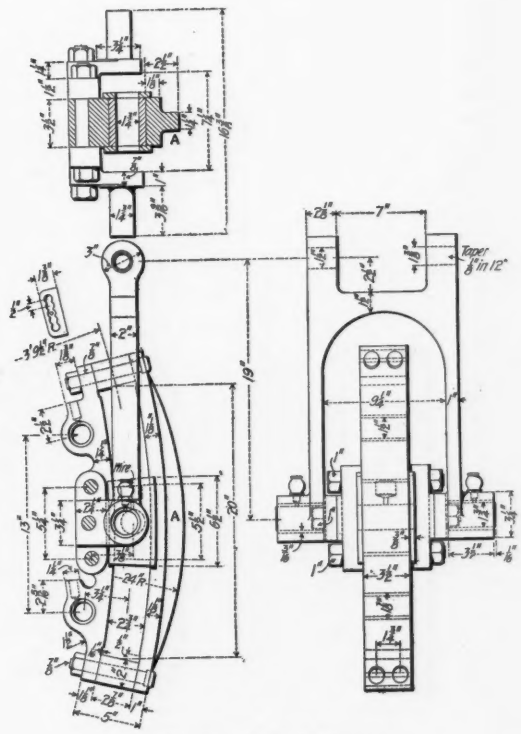


Fig. 6.—Link and Hanger.

ILLINOIS CENTRAL RAILROAD.—Built by the Rogers Locomotive Works.

passed along and perhaps some one else gets hurt or killed. We do not say that it is easy to prevent these things; but that they are not to be prevented by specifics, but by old-fashioned vigilance and discipline. The tabulation of observed defects is as below:

Uncoupling lever chain broken	513
" " chain too long	59
" " handle too close to car	227
" " bent and binds	81
" " missing	18
" " broken	12
" " keeper gone	71
" " keeper loose	366
Total defects	1,347
Total cars	1,264

Some Fundamental Distinctions in Locomotive Types.

Not long ago we saw a letter describing the relative performance of eight-wheel and ten-wheel locomotives hauling heavy trains on divisions having fairly heavy grades. A striking thing in this letter was the statement that the eight-wheel locomotives after a long trial were found much better adapted to that service than the ten-wheel engines. When late the eight-wheel engines had repeatedly made up from an hour to an hour and a half, while the best the ten-wheelers had ever done in making up time was about 40 minutes. Another road under very similar conditions has come to think so well of ten-wheel locomotives for heavy fast passenger trains, making the ordinary stops, that it has now adopted them for such service. Probably, if many opinions were brought together the differences would be surprising; at least, that is what a limited inquiry and some recent locomotive designs indicate. Perhaps the explanation is that present practice is often the result of reasoning from exceptions, and also that the particular service field for one type may overlap that of another; at least, the dividing line is not very clearly defined.

If we consider the locomotive merely as a machine, the usual types of passenger engines may be arranged in the order of simplicity and fewest wearing parts, as, single-driver, eight-wheel, Atlantic type and ten-wheel locomotives. Further, it is conceded that the locomotive which has the smallest number of wearing surfaces, driving axles, etc., that can be used under the conditions of trainload, and bridges and track, has the least internal friction and is the most efficient machine. That is, with similar designs of boilers and cylinder arrangements the simplest engine which will meet a given case is to be preferred.

If we examine the more important factors which enter into the selection of a type, the first thing to be considered is the tractive power at starting, and this is commonly taken as 22 per cent. of the weight on the driving wheels when the tires are new. This is probably a fair coefficient for favorable rail conditions, sanding devices being depended on to compensate for slippery rails. Also, the maximum and not the average conditions of starting must govern.* The tractive power required to start heavy trains where stops are fairly frequent, may in itself fix the type of locomotive as a ten-wheeler; however, if an eight-wheel locomotive has sufficient starting power the question of boiler capacity governs the final selection. If the schedule is fast, requiring a larger boiler than can be carried on two driving axles and a leading truck, under limiting track conditions, the choice then lies between the Atlantic type and the ten-wheeler. And until the advantages of wide grates are more generally realized, we may expect ten-wheel locomotives to be built in many cases where the Atlantic type would seem to be a more suitable machine. Probably the best idea of the limitations of the several types and the approach of present practice to the limits, can be got from locomotives actually built as given in the following table:

Type	Single-driver.	Eight-wheel.	Atlantic type.	Atlantic type.	Ten-wheel.
Road	P. & R.	C. & N. W.	P. R. R.	C. B. & Q.	L. S. & M. S.
Weight on driving wheels, lbs.	48,000	87,000	101,500	85,850	133,000
Size of driving journal, in. x in.	8½ x 12	9 x 11½	9¼ & 8½ x 13	8½ x 12	9 x 12
Weight per driving journal, lbs.	24,000	21,750	25,400	21,460	22,200
Weight, total, lbs.	115,000	137,000	173,450	159,056	171,600
Ratio of tractive weight to total weight, per cent.	41	63	58	53	77
Available tractive effort, lbs.	10,500	19,000	22,300	18,890	29,260
Driving wheels, diameter, in.	84¼	75	80	84¼	80
Heating surface, firebox, sq. ft.	128	179	218	180	223
" " total, sq. ft.	1,466	2,508	2,320	2,500	2,917
Grate area, sq. ft.	76	30	69	35	33.6

Referring to this table, it may be said that general American practice has doubtless reached such a point that the single-driver locomotive has little place; at any rate, its highest development under present track conditions was almost reached in 1895, when the Philadelphia & Reading locomotive was built. It will be seen that the available tractive effort of that engine is but a little more than 10,000 lbs., with a weight per driving journal which has since been exceeded in only one instance, but it is evident that a somewhat larger boiler might be used. We believe trains of four and five cars are successfully handled with the single driver locomotive, and some very fast runs have been made. But when trains of from six to nine cars are to be handled on fast schedules under ordinary conditions of grades such locomotives as the eight-wheel and Atlantic type become necessary. Those appearing in the table are the largest built of their respective kinds, and it is very apparent that the eight-wheel is much nearer the limit than the Atlantic type, and also a greater effort has been made toward reducing the dead weight and putting it into the boiler. The largest weight per journal now considered practicable is about 25,000 lbs. If the roadbed and structures permit us to use this weight, eight-wheel and Atlantic type locomotives may be built to exert a pull of about 23,000 lbs. at starting; and, in fact, the Pennsylvania engine cited in the table comes close to this. But it is doubted whether the boiler of an eight-wheel locomotive could be made with much over 2,500 sq. ft. of heating surface, while the boiler of an Atlantic type locomotive might be made almost as large as that of a ten-wheeler, if the trailing axle were heavily loaded. In addition, a wide firebox can be used, making the Atlantic type particularly suited for hauling medium sized trains at very high speeds. Where 12 and 14-car trains are hauled and a tractive power greater than 20,000 or 22,000 lbs. is required, the ten-wheeler becomes a necessity, and on a basis of 25,000 lbs. per driving journal, ten-wheel locomotives might be made to exert as much as 33,000 lbs. at starting, while from 3,000 to 3,500 sq. ft. of heating surface may be taken as about the limit.

The probable limits of the several types for some time to come may be roughly defined as follows: Single-driver type, maximum tractive effort, 11,000 lbs.; heating surface of boiler, probably about 2,000 sq. ft., with a wide grate; eight-wheel type, about 23,000 lbs. tractive power, 2,500 sq. ft. of heating surface and from 30 to 35 sq. ft. of grate area; Atlantic type, about 23,000 lbs. tractive power, 3,000 sq. ft. of heating surface and a wide grate; ten-wheel type about 33,000 lbs. tractive power, 3,000 to 3,500 sq. ft. of heating surface and from 30 to 35 sq. ft. of grate area. These limiting figures are of course based on 25,000 lbs. per driving journal which is higher than can now be used by more than a few roads. Where due regard for bridges and track makes smaller wheel loads necessary it is very plain that the field for the ten-wheeler widens, but we believe it will be found that freight locomotives are usually those for which bridges and other structures are designed. But, on the other hand, it is probably an unfortunate thing that the ten-wheel passenger locomotive is not well adapted to the use of a wide firebox which promises just now to be the most important advance in locomotive building. If the expectations for the wide firebox are realized, it would not be surprising if the Atlantic type with its large boiler capacity would become a very popular design of passenger locomotive, replacing the eight-wheel locomotive for the heavier class of service now worked by those engines and by small ten-wheelers. The ten-wheel passenger locomotive would then be more than ever a machine to be used only for the heaviest service and where no simpler locomotive could be used. It may be mentioned, however, that the principal advantage is lost when an Atlantic type locomotive is built with a narrow firebox, which has been done recently in a number of engines.

*The following, used by Mr. G. W. Henderson for estimating tonnage ratings on the Norfolk & Western, may be taken as safe working rules: Resistanee for grade, 0.33 lb. per ton for each foot rise per mile; train resistance at moment of starting, 20 lbs. per ton; resistance for curvature, 0.7 lb. per ton per degree of curvature for cars and 1.4 lbs. for locomotives; resistance on reverse curves, 25 per cent. greater than on simple curves.

October Accidents.

Our record of train accidents in October, given in this number, includes 165 collisions, 121 derailments and 6 other accidents, a total of 292 accidents, in which 44 persons were killed and 168 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

COLLISIONS.

	Rear.	Butting.	Crossing and other.	Total.
Trains breaking in two	14	0	0	14
Misplaced switch	4	5	11	20
Failure to give or observe signal	8	0	5	13
Mistake in giving or understanding orders	0	4	0	4
Miscellaneous	15	6	29	50
Unexplained	23	14	27	64
Total	64	29	72	165

DERAILMENTS.

Broken rail	0	Broken driving-wheel tire	1
Loose or spread rail	6	Misplaced switch	5
Defective bridge	0	Careless running	2
Defective switch	2	Bad switching	5
Defective joint	1	Too quick application of air brake	1
Bad track	2	Runaway	1
Broken wheel	7	Animals on track	3
Broken axle	11	Malicious loosening of brakes	1
Broken truck	6	Malicious obstruction	1
Fallen brakebeam	3	Accidental obstruction	1
Failure of drawbar	4	Unexplained	54
Failure of drawbar and automatic application of air brakes	1		
Broken car	3		121

OTHER ACCIDENTS.

Boiler explosion	2
Cars burned while running	1
Various breakages of rolling stock	1
Other causes	2
	6
Total number of accidents	292

A general classification shows:

	Collisions.	Derailments.	Other accid's.	Total.	P. c.
Defects of road	0	11	0	11	4
Defects of equipment	14	36	3	53	18
Negligence in operating	87	14	1	102	35
Unforeseen obstructions	0	6	2	8	3
Unexplained	64	54	0	118	40
Total	165	121	6	292	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other accid's.	Total.
Passenger	49	22	3	74
Freight and other	251	100	3	354
Total	300	122	6	428

The casualties may be divided as follows:

Killed.	Collisions.	Derailments.	Other accid's.	Total.
Employees	17	9	0	26
Passengers	3	1	0	4
Others	4	10	0	14
Total	24	20	0	44
Injured.				
Employees	84	20	3	107
Passengers	23	25	0	48
Others	8	5	0	13
Total	115	50	3	168

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. Killed.	Pass. Injured.	Emp. Killed.	Emp. Injured.
Defects of road	1	24	1	2
Defects of equipment	0	0	4	8
Negligence in operating	3	23	17	85
Unforeseen obstructions and maliciousness	0	1	0	2
Unexplained	0	0	4	10
Total	4	48	26	107

Thirty-four accidents caused the death of one or more persons each, and 61 caused injury but not death, leaving 197 (67 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with October of the previous five years shows:

	1899.	1898.	1897.	1896.	1895.	1894.
Collisions	165	111	91	72	60	92
Derailments	121	105	68	62	64	81
Other accidents	6	1	6	7	7	9
Total accidents	292	217	165	141	131	182
Employees killed	26	33	25	27	40	25
Others killed	18	12	29	22	9	19
Employees injured	107	87	65	55	73	107
Others injured	61	23	51	34	100	102
Passenger trains involved	74	46	36	48	40	65
Average per day:						
Accidents	9.42	7.00	5.32	4.55	4.19	5.87
Killed	1.42	1.45	1.74	1.58	1.52	1.42
Injured	5.42	3.55	3.74	2.87	4.94	6.74
Average per accident:						
Killed	0.15	0.21	0.33	0.35	0.36	0.24
Injured	0.58	0.51	0.70	0.63	1.18	1.14

A month ago we had to report a long list of train accidents for September with an unusually large proportion of accidents which were accompanied by fatalities; in October there is no such peculiarity, but the total number of accidents, 292, is very large. The largest number we find previous to this is 283, in October, 1890. In the last 10 years we find not over half a dozen months in which the total was as high as 250. The present long list contains a percentage of passenger trains fully up to the average; but the personal casualties do not appear to have increased with the accidents, which is an encouraging feature.

The number of passengers killed in October is not unusual, and of those reported two were in a freight caboose, and one lost his life by jumping off a passenger train in the dark; if he had remained on the car he would have been uninjured. One derailment was accompanied by a touch of humor, that at

Graceville, Minn., on the 17th. The State Railroad Commissioners had been appealed to by citizens to go out and examine a piece of railroad with a view to declaring the track too poor for the safe passage of trains; and the railroad company, by way of making the Commissioners' task easy, appears to have arranged for the derailment of the train on which they took passage!

It will be noted that in October the proportion of collisions is larger than usual; and of these collisions a large number occurred during the prevalence of fogs. We never classify a collision as due to fog, as every respectable code of rules contains provisions for running trains as safely in fog as in a clear atmosphere; and, moreover, the exercise of ordinary common sense ought to prevent most of the collisions that we read of in this connection. But as the daily newspapers generally accept "fog" as an adequate cause, the real cause is often reported with scant attention to accuracy, so that most of these collisions have to be classed as miscellaneous. That one of two or more causes produced the collision is quite apparent; but which one, is a point that cannot be determined.

On the 21st a half dozen passengers who had alighted from a train on the Brooklyn Elevated Railroad, in Brooklyn, N. Y., were knocked off the elevated structure into the street, by the body of a boy hanging to a car. Soon after the passengers had alighted (on account of a delay to the train) the cars were moved forward, and the boy, hanging to the side of one of the cars, was unable to ride clear of the persons walking along the planks at the side of the track. One of the passengers was fatally injured and most of the others suffered severe injuries. A woman walking in the street was scared to death.

The newspapers publish accounts of 22 electric-car accidents in October, in which four persons were killed and 102 were injured. One of the accidents was the derailment of a coal car on a street railroad which does freight business. One of the butting collisions was reported as due to trouble with electric signals, which were depended upon to give the right of the road to one of two cars approaching a meeting point from opposite directions. Six of these 22 accidents were cases where a street car was damaged or wrecked by being run into by a steam locomotive. All of the fatalities were in this kind of accident.

On Friday, Dec. 8, the new line of the Southern Railway to Savannah, Ga., was opened by a special train which carried a party of officers of the road and invited guests on an inspection trip. A part of the trip was made at the rate of 70 miles an hour, which is remarkable speed on a roadbed which is only six months old and has never carried regular traffic. Through trains to and from Florida were put on December 10. This extension of the Southern Railway was built in consequence of the sale of the Florida, Central & Peninsular, the Southern's former Florida connection, to interests affiliated with the Seaboard Air Line. By the new extension connection is made with the Savannah, Florida & Western, over which through trains will be run to and from Jacksonville. The New York and Florida Limited will be put on for the winter season January 16. This train will have all of the appointments and conveniences of former years, and there will be a sleeping car between New York and Tampa. The Official Guide for December contains a new map of the lines of the Southern Railway. The Savannah extension begins at Cayce, two miles south of Columbia, S. C. From this point a line about 32 miles long has been built to Perry. From Perry the line is the Carolina Midland, bought by the Southern, which extends to Allendale; and from the last-named point the Charleston & Western Carolina is used to Yemassee, on the Charleston & Savannah, whence the track of the latter is used to Savannah. The distance from Columbia to Perry is 35 miles, to Allendale 80 miles, to Yemassee 115 miles, and to Savannah 169 miles.

Senator Cullom has introduced in Congress a comprehensive bill for the amendment of the Interstate Commerce law. The bill is said to be in most respects similar to the Cullom bill of the last Congress, but there are numerous clauses, as reported in press dispatches, which indicate that someone with pretty radical notions has had a hand in drafting the new bill. It is said to give the Commission power to award damages to complainants and enforce its decisions. The Commission is also authorized to fix a maximum rate covering the entire cost of service; to fix both a maximum and minimum rate or differential rates that may be necessary to prevent discrimination; to determine the division between carriers of a joint rate and the terms and conditions under which business shall be interchanged when that is necessary to an execution of the provisions of the act; to make changes in classification and to amend regulations under which traffic is carried on. The bill provides procedure for legalizing pools and provides for the formation of joint traffic associations under the control of the Commission. It prohibits, under penalty of $10,000 fine, the paying of any rebate or granting of any special privileges in receiving, storing or handling freight. It also provides for a national freight classification to be made by the Commission.

Train Accidents in the United States in October.

(*Continued from page 861.*)

track, and 11 cars fell down a bank. A brakeman was injured.

31st, on Louisville & Nashville, near Paris, Tenn., a freight train was derailed by a broken flange and nine cars were wrecked. A brakeman was injured.

And 27 others on 18 roads, involving 1 passenger train and 26 freight and other trains.

Negligence in Operating.

12th, on Duluth, Missabe & Northern, near Proctor, Minn., a freight train consisting of a locomotive, 33 cars of logs and a caboose, became uncontrollable on a descending grade and ran at high speed to a point near Duluth. The runaway train broke in two and ran the latter part of its course in separate parts. The second portion was derailed at a curve and 15 cars were wrecked. The forward portion, consisting of the engine and three cars, ran some distance farther and broke through a trestle bridge. It appears that the engine was thrown upon the trestle by a switchman who took that course to prevent damage by the further progress of the engine on the main track, and that the derailment was due to the sharp curve approaching the trestle.

20th, on New York Central & Hudson River, at Oriskany, N. Y., four cars in a freight train were derailed by the too sudden application of the air brakes. A trainman was injured.

And 12 others on 11 roads, involving 3 passenger and 9 freight and other trains.

Unforseen Obstructions.

23rd, 10 p. m., on Illinois Central, near Charles City, Ia., a passenger train was derailed and the engine was overturned. The engineman and one passenger were injured. It is said that the rails had been loosened by train wreckers.

25th, on Bangor & Aroostook, near Blanchard, Me., a work train was derailed by some cattle on the track, and several cars were ditched. One employee was injured.

And 4 others on 4 roads, involving 1 passenger train and 3 freight and other trains.

Unexplained.

1st, on Chicago & Northwestern, near Lewiston, Minn., a freight train was derailed and five cars were wrecked. A brakeman and a tramp were injured.

2nd, on Kansas City, Pittsburgh & Gulf, near Wilton, Ark., a freight train was derailed and the engine and three cars were overturned. A brakeman was killed and two other trainmen were injured.

2nd, on Lehigh Valley, near Penn Haven Junction, Pa., an empty engine was derailed and fell down a bank; at the foot of the bank a freight train of the Central of New Jersey was passing at the time and the Lehigh Valley engine fell upon the cars a short distance from the front end of the train. Twelve cars were wrecked and some of them fell into the Lehigh River. A brakeman on the Lehigh Valley engine went down with the engine, and the body of this man and of another, both badly burned, were taken out of the wreck. The engineman and another employee were injured.

5th, on New York, Chicago & St. Louis, at Bellevue, O., the engine and baggage car of a passenger train were derailed and overturned; the engineman and fireman were injured.

7th, 10 p. m., on Erie road, near Union City, Pa., a freight train was derailed and several cars fell down a bank. Two tramps were injured.

8th, on Saranac & Lake Placid road, near Ray Brook, N. Y., a passenger train was derailed, and a sleeping car and a day car fell down a bank. One passenger was injured.

8th, on Pennsylvania road, near Spring Creek, Pa., a freight train was derailed and several cars were damaged. A man riding on one of the cars was fatally injured.

21st, on Louisville & Nashville, at Caborn, Ind., a freight train was derailed and several cars were wrecked. Two tramps were injured, one of them fatally.

26th, 3 a. m., on Nashville, Chattanooga & St. Louis, near Chattanooga, Tenn., a freight train was derailed and the conductor was killed.

27th, on Southern Pacific, near Langtry, Tex., a freight train drawn by two engines was derailed and wrecked, both engines being overturned. Two trespassers were killed and two trainmen and a tramp were injured.

30th, on George's Creek & Cumberland, near Cumberland, Md., a freight train was derailed and a brakeman was injured.

31st, on Cleveland, Cincinnati, Chicago & St. Louis, near Guilford, Ind., a car in a freight train was derailed and broke down a bridge and 15 loaded cars were wrecked. Two men stealing a ride were fatally injured.

And 42 others on 35 roads, involving 7 passenger and 35 freight and other trains.

OTHER ACCIDENTS.

12th, on Louisville & Nashville, at Strassburg, Ala., the locomotive of a freight train was wrecked by the explosion of its boiler, and three employees were injured. It is said that the engine was a new one.

15th, 1 a. m., on Chicago, Rock Island & Pacific, near Joliet, Ill., the locomotive of a freight train was wrecked by the explosion of its boiler, and a brakeman was injured.

25th, on Oregon Short Line, near Juab, Utah, two cars and the caboose of a freight train were wrecked by an explosion of powder in one of the cars.

And 3 others on 3 roads, involving 3 passenger trains.

A summary will be found in another column.

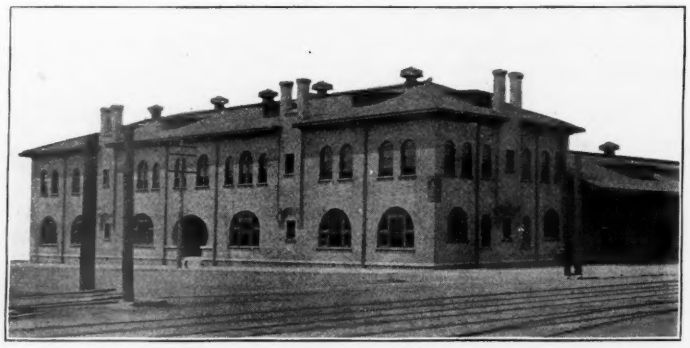
New Freight House and Shops at Montgomery.

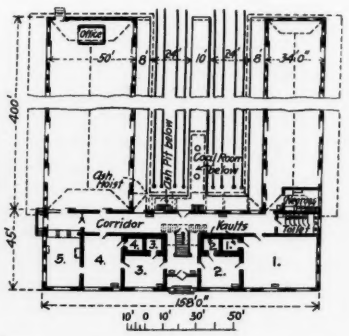
The Western Railway of Alabama has recently finished extensive improvements at Montgomery, consisting of office building, freight houses, yards, and shops. The old freight station was so far from the business center of Montgomery that it was found necessary, in order to hold the business, to build closer to the business center. Realizing this fact President George C. Smith took steps to secure the necessary land, and after much difficulty succeeded in obtaining about nine acres in the business center, and near all the other railroad terminals.

The general plan for utilizing this land was worked out by President Smith and Resident Engineer G. F. Huggans, and the buildings were planned by Mr. Grant Wilkins, an engineer of Atlanta, who also arranged many details.

The office building (shown in the engraving) is a two-story and basement structure, with the main front on Coosa Street of 158 ft., and a side front or end of 45 ft. on Tallapoosa Street. The whole contains a floor area of 14,220 sq. ft. In this building are located the offices of the freight department. The exterior of the office building is faced with a light gray Baltimore brick, mottled with manganese, with terra cotta trimmings to match; granite steps, mosaic vestibules and slate roof. The interior is handsomely finished in Georgia pine and quarter sawed oak, and there are seven large fire proof vaults.

The freight houses, outward and inward, are situated in the rear of the office building, one on either end of it, and are each 400 ft. long. The forwarding depot is next to Tallapoosa Street and is 34 ft. wide, with a floor area of 12,400 sq. ft. On this side there is a 30 ft. paved wagon way. On the track side of this house there is an 8 ft. platform along the whole length of the building. The roof projections on each side are 10 ft. wide. In this building there are two platform scales, and a small office in the middle for clerks.





New Freight House and Offices of the Western Railway of Alabama at Montgomery.

The delivering freight depot is next to the bulk tracks. It is 50 ft. wide with a floor area of 18,800 sq. ft. In this there is one platform scale, an office for clerks, and also an office for the yardmaster. On the outer side next to the bulk tracks is a paved wagon way 50 ft. wide.

Between the freight houses are four tracks with a 10 ft. transfer platform in the center.

The freight houses are one story, brick, with truss roofs and slate covering. The roof projects on either side 10 ft. beyond the face of the walls. The sides of these houses are laid out in panels, every other panel having a door opening of 9 ft. 3 in. in width by 9 ft. in height, closed with doors hung on tracks with ball bearing hinges. The other panels are provided with two windows each about 10 ft. above floor line, from which the building is well lighted when the doors are shut. There are also dormer windows in the roof for additional light and ventilation. The arrangement of platforms, etc., is shown in the sketch plan.

The freight house floors are made of concrete 9 in. thick laid on the ground, with 3 in. x 4 in. sleepers bedded into the concrete, the whole being covered with Georgia pine plank 2 in. thick, surfaced and well spiked. The roof trusses are of long leaf yellow pine, with necessary bolts, rods, and other fastenings of iron. The bulk tracks are located for convenience and economy in labor. They are all in pairs with wide paved roadway between.

The shops and general yards are some distance from the freight house, but are reached by convenient

tracks. The shops are all of brick, steel, iron, wood and glass, and have the necessary fixtures and appliances for economical handling of work and material required for the road's work. The dimensions of the principal shop buildings are as follows: Car shop, 62 ft. x 207 ft.; machine shop, 102 ft. x 115 ft.; paint shop, 63 ft. x 100 ft.; boiler shop, 53 ft. x 83 ft., and blacksmith shop, 35 ft. x 83 ft. Besides these there is a power house, a storehouse and an office. The roundhouse has 21 stalls.

The Central of Georgia shares in the use of these terminal facilities at Montgomery. The total investment made by the Western of Alabama in these new terminals aggregates about $250,000 for land and $150,000 for improvements in the form of yards, shops, office building and freight houses.

Worm-eaten Piles.

At a recent meeting of the Western Society of Engineers, Mr. Onward Bates, Superintendent of Bridges and Buildings of the Chicago, Milwaukee & St. Paul, presented some notes on white oak (Arkansas) piles which were destroyed by worms; together with specimens of the worms and eaten timber. The experience was so unfavorable that no more piles from that region have been used. Mr. Bates said, in part:

In the pile bridges on the lines of this railroad there are about 140,000 piles. These piles are usually cut in the territory tributary to the railroad lines—the principal supply coming from the States of Wisconsin and Michigan. Wisconsin white oak piles are preferred above all others, but the supply of these is not equal to the demand. White cedar piles are next in favor, and will last as long, but are not so strong as the white oak. For temporary work and foundation piles, tamarac, Norway pine and rock elm are used. The experience on this road with worm-eaten piles is limited, being confined to a lot of white oak piles obtained from the State of Arkansas, and it will be readily understood that the discovery of these insects which threatened the safety of our bridges and shortened the life of them, was the cause of anxiety to those in charge of the maintenance of the bridges.

In the year 1888 an exceptionally large number of piles was required for the renewals of pile bridges in that year, and not being able to obtain the requisite number of Wisconsin piles, recourse was had to the white oak piles of Arkansas. When these Arkansas piles had been in use for two years the presence of the worms was noticed, and from that time until all of those piles were replaced, the worms were a menace to the safety of the structures, requiring close watching and frequent repairs to keep the bridges in good condition. With the purpose of learning something more of these insects, I wrote to the Chief of the Forestry Division of the Department of Agriculture, as follows: :

During the season of 1888 we received some Arkansas oak piles which were driven that year in various bridges on this Company's lines in the western part of Iowa and southeastern part of South Dakota. These piles were peeled when received and were apparently cut in the summer previous to their receipt, as they were smooth, with hardly the mark of an axe on them. They had from 2 to 2½ in. of sap of a reddish color, but were very tough and required but few rings in driving them. Altogether these piles appeared to be as good as any yet received by us, but in the spring of 1890—two years after driven—it was discovered that worms were eating into these piles on the Running Water Branch of the I. & D. Division, where it was found that about 60 of the piles were so badly destroyed that new piles had to be driven to replace them. In the fall of 1892, on an official inspection it was found that a large number of the Arkansas piles were badly decayed, and in the spring of 1893 it was discovered that these piles were alive with worms.

These worms were working from the surface of the ground to a depth of 3 ft., some of the piles being entirely eaten off about 18 in. below the surface of the ground, and it was estimated that each pile contained from 100 to 150 of these worms. There was no indication of these worms in the piles when driven, and so far as can be ascertained they were not found in the locality of the bridges. They did not become manifest until the sap began to decay and it was then discovered by our inspector, while testing piles with a pick bar, that the piles were being destroyed below the surface of the ground. In many cases with one blow he was able to thrust a bar entirely through a pile.

The soil in which the worms seem to do the most damage is sandy, and they appear to be most destructive in dry seasons. They begin at the ground line and work clear through the pile, except when the sap is removed, and then they work downward. There seems to be some peculiarity about the sap in the Arkansas oak that attracts these worms, as they do not attack the northern oak. We had some bents composed of two Arkansas oak piles and two northern oak piles, and while the former were entirely destroyed by the worms, the latter were not touched by them.

While these worms have attacked the Arkansas oak piles in various localities, they are most plentiful between the Missouri and the James Rivers on the Running Water Branch of the I. & D. Division in South Dakota.

The following reply was received:

In reply to your letter, permit me to say that of the group of insects represented in the photograph only the two, apparently legless, worms are true wood-borers, the rest, probably all forms of the same species, are harmless insects working only in rotten wood and belonging to the same family as the common May beetle. The wood-borers restrict their work to the sapwood, generally, but under some circumstances enter the heart. If an oak is felled in Arkansas in May and left only a week on the ground and unbarked, the boring insects will have deposited their eggs by the thousands. Even if peeled and taken away, young larvae will continue their mischief. If the bark is pushed off, the logs at first do not show any conspicuous signs of the presence of these borers and thus may easily pass muster. From the fact that the piles decayed so readily it seems plausible that:

1. They were left in the bark for some time before peeling.
2. That they became infested by fungi (causing decay) as well as the borers.
3. That they remained in the wood for some time and thus facilitated the progress of both.

Any after-treatment except impregnation or subjection to dry kiln seasoning could not benefit these timbers. Had they been cut in winter (any time after September 15), peeled and at once taken out of the woods to some dry yarding ground, they would have lasted as well as Wisconsin oak. Oak sapwood is generally not durable and it might be well to cut it away wherever the exposure requires great durability.

It was intended to make further investigation, but the matter dropped with the discontinuance of the use of Arkansas piles, and since then our supply of white oak piles has been obtained from Wisconsin.

It is customary for an engineer, in making a statement, to give his conclusions, but in this instance I have none to present, and content myself with the statement of experience. Some condition not definitely ascertained is responsible for this experience, and it would be unfair to condemn the southern timber on one experiment. It is doubtless right that under proper conditions of time when piles were cut and subsequent treatment, they would have been satisfactory. Our experience was an unhappy one, and while we can get piles from Wisconsin which never fail us, we are inclined to avoid a repetition of the wormy ones. It was the general verdict of all the practical men who had to do with these piles after they were in the bridges, that they are not as good as pine piles, and a strong prejudice against all southern piles resulted. When the piles were discovered to be worm-eaten, a partial remedy was provided by digging a hole about two feet deep around each pile was cutting off the sapwood, leaving the heart-wood exposed to the air. This treatment prolonged the life of the piles, but they all had to be replaced within a few years.

Canadian Government Subsidies.

The Canadian Government has granted new subsidies aggregating $6,590,295. Of this $1,597,120 is in re-votes on 499½ miles of railroad at $3,200 per mile; $2,812,000 new votes on 878¾ miles at $3,200 per mile; $896,000 on the Ontario & Rainy River line at $6,400 per mile; $1,000,000 on the Quebec bridge; $201,425 on other new bridges in Quebec; $33,750 on other new bridges in Nova Scotia; re-votes on bridges, $50,000. The subsidies in detail are as follows:

Central Ontario extension from either Coe Hill or Rathbun Station to Bancroft, not exceeding 21 miles; re-vote.

Great Northern, Montcalm to St. Tite Junction on the Lower Laurentine Railway, Quebec, not exceeding 53½ miles; and branch from their main line to Shawnegan Falls, Quebec, not exceeding 6½ miles; 53½ miles re-vote.

Phillipsburg Ry. & Quarry Co. shortage in the extension from a point on the company's line at or near the end of the subsidized section to the Government wharf at Phillipsburg, Que., not exceeding 6.6 miles; re-vote.

Strathroy & Western Counties, Strathroy, Ont., via Adelaide and Arkona to either Forest, Thedford or Parkhill, not exceeding 24 miles, in lieu of subsidy granted by 57-58 Victoria, chapter 4; partly re-vote.

St. John Valley & Riviere du Loup, Fredericton to Woodstock, not exceeding 59 miles; re-vote.

Line from Port Hawkesbury, on the Strait of Canso, Nova Scotia, to St. Peters, not exceeding 30 miles; re-vote.

Line from Windsor, N. S., to Truro, via Township of Clifton, not exceeding 58 miles; re-vote.

Line from a point at or near Brockfors Station, N. S., on the Intercolonial Railway, to Eastville, not exceeding 25 miles; re-vote.

Line from Cross Creek Station on the Canadian Eastern, to Stanley Village, N. B., not exceeding 6 miles; re-vote.

Line from St. Remi to Stottsville, or some point on the Delaware & Hudson (Grand Trunk), in the Parish of St. Valentine, not exceeding 19 miles; 12 miles re-vote.

Line between Pontypool and Bobcaygeon, via Lindsay, Ont., not exceeding 40 miles; 32 miles re-vote.

Pontiac Pacific Junction, Aylmer to Hull, Que., in lieu of the subsidy granted by 60-61 Victoria, chapter 4, not exceeding 9 miles.

Portage du Fort & Bristol Branch line on the Pontiac Pacific Junction from Quyon toward the village of Portage du Fort, Que., not exceeding 15 miles, in lieu of the subsidy granted by 60-61 Victoria, chapter 4; re-vote.

Orford Mountain branch from a point between Lawrenceville and Eastman, to Waterloo, not exceeding 13 miles; 4½ miles re-vote.

Atlantic & Lake Superior, from Coplin to Paspebiac, Que., not exceeding 30 miles.

United Counties, from St. Robert Junction to Sorel, 6½ miles, and from Mount Johnson to St. Gregorie Station, 1 mile, not exceeding 7½ miles.

Line from a point on the Central Ry., County of Linerburg, N. S., to Liverpool, via Caledonia, or to Caledonia, Liverpool, or any part thereof, not exceeding 62 miles; re-vote.

Line from Indian Garden, Queens County, N. S., to Sherbourne, 35 miles; re-vote.

Ontario & Rainy River subsidy under chapter 4, 60-61 Victoria, $6,400 per mile for the 80 miles.

Bay of Quinte extension of 10 miles, not exceeding $32,000; re-vote.

Quebec & Lake St. John, for 12 miles from end of line at Deep Water, on the Chicoutimi branch, to Ha Ha Bay, in lieu of the subsidy granted by chapter 4 of 1894.

Line from Hawkesbury, Ont., to South Indian, not exceeding 35 miles.

Line from Sault Ste. Marie, Ont., toward Michipocoton River and Harbor, and to main line of Canadian Pacific Railway, not exceeding 40 miles.

Branch from the main line of the Ottawa, Arnprior & Parry Sound to Parry Sound, Ont., not exceeding 5 miles.

Line from Haliburton, via Whitney, toward Mattawa, Ont., not exceeding 20 miles.

Tilsonburg, Lake Erie & Pacific extension from Tilsonburg to Ingersoll or Woodstock, Ont., not exceeding 28 miles.

To the South Shore Railway Company, from Sorel Junction along the south shore of Lotbiniere, Que., not exceeding 33 miles.

Massawippi Valley extension to Stanstead Plain, Que., not exceeding 2¼ miles.

Line from Port Hawkesbury on the Strait of Canso to Caribou Cove, N. S., 10 miles.

Line from Port Frances, Ont., west to the mouth of Rainy River, not exceeding 70 miles.

General Ry. Co. of New Brunswick, extension from Newcastle coal fields to Gibson, N. B., not exceeding 30 miles.

Canadian Northern from a point on the Winnipeg Great Northern, north of Swan River, to Prince Albert, N. W. T., not exceeding 100 miles.

Line from some point near Arthur Station to a point south of Moose Mountain, Man., not exceeding 50 miles.

Line from Sunnybrae to County Harbor and from a point at or near County Harbor cross roads to Guysboro, N. S., to make up deficiency in mileage, not exceeding 15 miles additional.

Line from Port Clyde to Lockport, N. S., not exceeding 20 miles.

Line from a point on the Intercolonial at or near Halifax to a point on the Central Railway in the county of Lunenburg, not exceeding 20 miles.

Line from Labelle, Que., to Nomininigue via Notre Dame del Annonciation, not exceeding 22 miles.

Line from Owen Sound to Meaford, not exceeding 21 miles.

Ottawa & Gatineau line through the city of Hull, Que., not exceeding 4 miles.

Western Alberta, from a point on the United States boundary west of Range 27, northwest toward Anthracite District of Alberta, not exceeding 50 miles.

Edmunton, Yukon & Pacific, South Edmunton, N. W. T., to North Edmunton, and thence west toward the Yellow Head Pass, not exceeding 50 miles.

Restigouche & Western, in addition to the 20 miles granted and in continuation toward the St. John River, not exceeding 15 miles, and toward Campbellton 12 miles, in all not exceeding 27 miles.

Extension of the St. Francis branch of the Temiscouta to the mouth of the St. Francis River, not exceeding 3 miles.

Canada Eastern, from Nelson, N. B., to connect with the main line into Chatham, 2¼ miles.

Bay of Quinte extension west from Deseronto, not exceeding 2 miles; also extension from Tweed, north, not exceeding 5 miles; in all 7 miles.

Ontario, Belmont & Northern extension from iron mines northwest, not exceeding 5 miles; also extension south from the present southern terminus to the Central Ontario junction of the Canadian Pacific, not exceeding 2 miles; not to be granted in case the Railway Committee of the Privy Council finds that adequate running powers on fair terms cannot be secured to the company over the Central Ontario.

Line from a point on the Pembroke Southern Ry. at or near Golden Lake, Ont., toward a point on the Irondale, Bancroft & Ottawa at or near Bancroft, not exceeding 20 miles.

Line from Paspebiac, Que., to Gaspe, not exceeding 82 miles.

Lake Erie & Detroit River from Ridgetown, Ont., to St. Thomas, not exceeding 44 miles; payable only in the event of adequate running rights over the Canada Southern between the two points not being granted on terms to be approved of by the Railway Committee of the Privy Council.

Kingston & Pembroke branches from the company's main line to the iron mine at Bluff Point, and to the Marteir mine, in the County of Renfrew, not exceeding 5 miles.

Line from Parry Sound north toward Sudbury, not exceeding 20 miles.

Ontario & Rainy River from Stanley Station, on the Port Arthur, Duluth & Western, to Fort Francis, 140 miles, at $6,400 per mile, not exceeding in the whole $896,000.

Quebec Bridge Co., railroad bridge over the St. Lawrence River at Chaudiere Basin, near Quebec, $1,000,000, payable 40 per cent. on monthly progress estimates approved of by the Government Engineers of materials delivered and work done.

South Shore Ry., restoration and renewal of railroad bridge over the Yamaska River at Yamaski, Que., $50,000; re-vote.

Bridge over the Richelieu River at Sorel, 15 per cent. upon the amount expended thereon, not exceeding $35,000; re-vote.

Bridge across the St. Francis River, 15 per cent. of the amount expended thereon, not exceeding $50,000.

Bridge across the Nicolet River, 15 per cent. upon the amount expended thereon, not exceeding $15,000.

Midland Ry. Co., Ltd., bridge across the Shubenacadie River, 15 per cent. upon the amount expended thereon, not exceeding $33,750.

Great Northern bridge across the St. Maurice River, 15 per cent. upon the amount expended thereon, not exceeding $16,425.

Bridge across the Riviere du Loup, 15 per cent. upon the amount expended thereon, not exceeding $15,000.

Bridge across the Lac River, 15 per cent. upon the amount expended thereon, not exceeding $15,000.

TECHNICAL.

Manufacturing and Business.

The Unadilla Valley, 80 Broadway, New York, is asking bids until Jan. 15 for 12,000 ties. Specifications and further information will be furnished on application to the company.

The F. C. Austin Mfg. Co., Harvey, Ill., is offering for sale seven overhead automatic dump buckets, three of which are of 1¼ yards, or 3,200 lbs., capacity and the balance of one yard, or 2,700 lbs., capacity.

Bryan & Company, Detroit, makers of foundry machinery, now have orders booked to run their plant overtime well into February. Two very large Collian furnaces for the Westinghouse Machine Co. and a large amount of general foundry machinery

for the Grand Rapids Malleable Co. are some of the largest orders.

The Bullock Electric Mfg. Co., Cincinnati, has asked for bids on a 200-ft. extension to its main shop building, which will make the main machine shop 500 ft. long by 101 ft. wide. The addition has been made necessary on account of large increases in business. During November orders were received for 51 motors and generators of various sizes.

The Cooke Locomotive & Machine Co. is offering for sale one Cleveland Helve Hammer weighing about 50,000 lbs., the weight of head and die being 2,500 lbs.; steam cylinder, 26 in.

C. H. Dickerman has resigned as district manager of the American Car & Foundry Co. at Milton, Pa. He is succeeded by C. L. Rogers, formerly assistant district manager. The position made vacant by the advancement of Mr. Rogers will be filled by W. C. Dickerman.

The 500 large steel cars being built by the Pressed Steel Car Co. for the Pittsburgh, Bessemer & Lake Erie will be equipped with Harrison dust guards, made by the Harrison Dust Guard Co. of Toledo, O., as will also the 50 new coal cars being built for the Hocking Valley by the Pullman Co., and on the new cars for the New York Central & Hudson River

The Case Manufacturing Co., Columbus, O., reports a very large business in electric cranes of all kinds.

Seventeen box cars, three snow plows and a construction car belonging to the Boston & Quincy St. Ry. Co. were destroyed by fire in the car barn of that company at City Square, Quincy, Mass., Dec. 6. The valuation of the property destroyed is about $60,000.

Iron and Steel.

The American Steel & Wire Co. has begun work on rebuilding the wire mill at Waukegan, Ill., which was recently burned. The mill will be entirely rebuilt from new plans and equipped with the most modern machinery. The galvanizing room will be extended 70 ft. at the north end. The company has let a contract for a vertical cross compound engine to develop 3,300 h. p. to the E. P. Allis Co. of Milwaukee.

Work has been begun on the Neville Island plant, on the Ohio River, of the American Steel & Wire Co. An 800-ton blast furnace will be the first work undertaken.

The officers of the Logan Mfg. Co., which was incorporated several months ago in Pennsylvania, are: President, Geo. F. Huff; Treasurer and Manager, John W. Logan, and Secretary, A. H. Jameson. The office and works are at Phoenixville, Pa. The company is organized to make steel castings of comparatively small size. The plant will probably be in operation in three weeks.

The Portland Rolling Mill Co., at Portland, Me., has been sold to C. J. Kane of Buffalo, N. Y., and a number of Pittsburgh capitalists. It is stated that the plant will be moved to the Pittsburgh district on the Monongahela River, and a new company organized with a capital of $250,000.

The property of the Raymond & Campbell Mfg. Co. of Middletown, Pa., said to be worth $300,000, will be sold at receivers' sale Jan. 12. Benjamin M. Nead of Harrisburg and Joseph F. Raymond of Middletown are the Commissioners appointed by the Court to conduct the sale.

The Columbia Iron & Steel Foundry Co. has applied for a charter in Pennsylvania. C. C. Lee, C. W. Robb, Geo. P. Loomis and others are interested. A plot of ground 110 x 140 ft. on the Allegheny Valley Ry., Pittsburgh, has been bought by the new company, which proposes to build a plant at this place to make iron and steel castings.

The Carnegie Steel Company's announcement of Mr. H. C. Frick's resignation is as follows:

At a meeting of the Carnegie Steel Co., Ltd., Dec. 5, Mr. Frick informed his partners of his desire to give up the duties of Chairman of the Board of Managers, and asked to be relieved in order to join Mr. Carnegie, Mr. Phipps and Mr. Singer as consulting partners of the company [without pay.] Mr. Frick's partners assented to his request. A successor to Mr. Frick was not chosen, as it is intended to abolish the office of Chairman, since Mr. Frick leaves it. Mr. Henry M. Curry, who has been long confined by illness, sent in his resignation as a member of the board, which his partners were forced to accept with great reluctance. George Lauder and A. M. Moreland, Auditor of the company, were unanimously elected to fill the vacancies. The changes took immediate effect.

The Gruson Iron Works has bought 186 acres at Eddystone, Pa. The contract for the new plant has been let and it is stated work will be begun soon. The company was organized under the laws of New York to make the so-called Gruson turrets for coast defence guns. The company is capitalized at $500,000, all paid in in cash; and has authority to increase its capital to $2,000,000, which will be done later.

Work on the new steel plant at Stony Point, N. Y., is reported to be in progress. Docks and a branch railroad will first be built. John A. Albright of Buffalo is interested.

The American Steel Casting Co. of Chester, Pa., has declared a semi-annual dividend of 3½ per cent. on the preferred stock, payable Dec. 28.

In our item regarding the letting of contracts for the six new steel cruisers, we stated that the Fall River Engine Co. had been awarded one of the cruisers instead of the Fore River Engine Co., of Braintree, Mass., which is the name of the company to whom the contract was given.

The Atlantic Iron & Steel Co. has been incorporated in New Jersey, with a capital of $10,000,000, of which one-half is preferred stock. This company is to be a consolidation of the New Haven Iron Co. and the Susquehanna Iron Works. Among the incorporators are: Chas. A. Porter, Kenedy Crossman and Wm. P. Martin. The directors of both companies, at a meeting in Philadelphia last week, decided to build an $800,000 pipe plant at the works of the Susquehanna company at Columbia, Pa.

The Compania Minera y Afinadora of Monterey, Mexico, are, according to report, shortly to be in the market for the equipment of a lead refinery, consisting of generators, motors, air compressors, furnace castings, wrought iron and steel work for same, floor castings, etc. The contract for the buildings, which are to be of steel, has been placed with the Pittsburgh Bridge Co. Mr. F. Schnider, of No. 77 Pine St., New York, is the Consulting Engineer.

The Mexican Industrial Co., recently organized in Mexico to develop the iron and steel industry in that country, will, it is said, build a large plant at Chihuahua to make billets and rails. The new company is allied with the Chihuahua & Pacific Railroad now building.

A dividend of 20 cents per share for two months has been declared on the capital stock of the New Haven Iron & Steel Co., payable Dec. 30.

It is proposed under the consolidation of the West Virginia Central & Pittsburgh Ry. and the Davis Coal & Coke Co., to increase the number of coke ovens from 700 to 1,000. The present capacity of the mines is about 5,000 tons daily, and about 800 tons of coke. The increase will make the coke output 1,200 tons.

The Portuguese Government wants bids for an iron port bridge 260 meters (853 ft.) long and 20 meters (65½ ft.) wide, to be built in the port of Lorenzo Marquez, Delagoa Bay (South East Africa), Bids are to be deposited with the general office of the Colonies, at Lisbon, by March 23, 1900. Eighteen months are allowed to finish the work. Security to be deposited provisional, 20,000 milreis ($10,920); definite, five per cent. of sum for which contract is awarded.

Iron Age says that after so long a period of the intensest activity, the iron and steel markets have quieted down considerably. A number of causes contribute to bring this about. Prominent among them is the circumstance that a large part of the requirements in many lines has been covered, not alone for the first half of 1900, but also for a part of the second half. This is notably true of Besemer pig, and largely true of foundry irons. It is true also of rails, but to a more limited extent only of steel billets and sheet bars. Some of the large consuming interests, for billets, have covered pretty well into the spring. Others, on the other hand, have been in the market for very considerable blocks for the first half, but profess to have views as to prices which sellers are quite unwilling to entertain. Billets, like a number of rolling mill products, have had an appearance of weakness lately, which is really nothing but a readjustment in prices. The days of high premiums to procure immediate delivery are over for the present, and values are on a more conservative and sounder basis, taking costs into consideration. Another reason for the lull is the season. A good deal of the outdoor work, in many sections of the country, ceases altogether.

The Southwestern Iron & Pipe Co. has bought from the Cherokee Iron Co. and the new Birmingham Iron & Improvement Co. their two 50-ton blast furnaces, cast iron pipe foundry, 15,000 acres of ore land, water works, townsite, etc. Rogers, Brown & Co., New York City, can give particulars.

Reports state that the Republic Iron & Steel Co. has started work on a bloom mill adjacent to the 50-ton steel plant of the Birmingham Rolling Mill.

The plant of the National Steel Casting Co. at Montpelier, Ind., has been sold to S. S. Deemer, formerly for 17 years with the Chester Steel Casting Co., and his brother, W. G. Deemer, they will make a specialty of high and low carbon steel castings of any weight from 5 to 40,000 lbs. Their father, John J. Deemer, who was Superintendent and General Manager of the Chester Steel Castings Co. for the past 25 years, is identified with the new company.

The Pennsylvania Steel Company has declared a dividend of 1¾ per cent. on its preferred stocks, payable Jan. 15.

E. E. Knapp, of Chester, Pa., formerly with the Tidewater Steel Company, has been appointed Superintendent of the blast furnaces of the E. & G. Brooke Iron Co., of Birdsboro, Pa.

The Lewis Foundry & Machine Co. of Pittsburgh will not build a new plant near Pittsburgh, as stated last week.

The Mahoning Foundry & Machine Co., of Youngstown, O., has been incorporated, with a capital stock of $25,000, by Geo. H. McKelvey, L. E. Cochran, Frank D. Runser and Mason Evans. The company proposes to make wrought iron and steel castings and will take over a plant in Youngstown. Frank D. Runser is President.

It is reported from Marquette, Mich., that the total shipments of ore from that point last season were 2,720,000 tons, or nearly 500,000 tons more than for the season of 1898.

New York Water Supply.

The Merchants' Association of the City of New York has appointed a large committee of engineers, lawyers and business men to consider and report upon the general question of the water supply of the city, including therein the entire limit of Greater New York. The engineering committee consists of Messrs. T. C. Clarke, H. S. Haines, Rudolph Herring, E. P. North, E. E. Olcott, H. G. Prout, D. McN. Stauffer and R. R. Bowker. This committee has engaged for special work Messrs. J. J. R. Croes, J. F. Fuertes and Foster Crowell.

Failure of a Wrought Iron Shaft.

Mr. Onward Bates recently exhibited before the Western Society of Engineers a specimen of an iron driving shaft taken from a double track railroad draw-bridge at Milwaukee which showed the effect of reversal of stress on such shafts under moderate loads. The shaft was $3\frac{7}{16}$ in. in diameter and was forged from rectangular bars piled together; the failure was through the separation of these bars. The shaft had been in service about 12 years, and it is estimated that the bridge was opened about 1,600 times during that period. This specimen is of greater interest as being the fourth case of such failure which has come under Mr. Bates' observation. The shaft worked in a deep sleeve casting with journals at the top and bottom ends, and this sleeve served to hold the layers together after the shaft had disintegrated. The movable span worked by the shaft is 170 ft. 6 in. center to center of end pins, the bridge revolving weighs about 540,000 lbs., and is carried by 44 rollers 18 in. in diameter and 6¾ in. face; the rollers and upper and lower treads are of cast iron and the ends of the span rest on cast iron rollers. The bridge is turned by hand power, usually by two men, and an extra man is employed when conditions are such as to require speed, or when retarded by snow. The length of the capstan wrench is about 8 ft.; pinion of capstan shaft, 47 teeth, 1⅝ in. pitch and 5 in. space; spur wheel on driving shaft 104 teeth, 1⅝ in. pitch and 5 in. face; pinion on driving shart 12 teeth, 3 in. pitch and 6 in. face, and the rack on the pier has 336 teeth, 3 in. pitch and 6 in. face.

New York & New Jersey Bridge.

James S. Clarkson, President of the New York & New Jersey Bridge Co., has asked the Sinking Fund Commission of New York City to name a date for a hearing on a franchise application for a union railroad station as a terminal for the bridge. He states that the company has been reorganized.

A New Car Wheel Enterprise.

The plant of the Kansas City Car & Foundry Co. in Armourdale near Kansas City, Mo., has been sold to T. A. Griffin of the Griffin Wheel Co., Chicago, Ill. It is stated that improvements will be made to the purchased plant to increase the capacity. From last reports, the annual capacity of the plant was 90,000.

The New East River Bridge.

Last week the East River Bridge Commissioners opened the bids for the cables, suspenders and their attachments for the New East River Bridge. This part of the structure was described in our issue of Nov. 24, p. 803, and the specifications were given Nov. 17, p. 789. Only one bid was received, that of the John A. Roebling's Sons Co., of Trenton, N. J., which bid was $1,398,000. This is estimated to be at the rate of about 14 cents a pound for the material. We have heard two plausible explanations of the fact that only one bid was offered. It is said that the time was considered too short, namely, ten months from the date when the saddles shall be set on the tops of the towers, which, it is supposed, will take place about next May. Therefore, the contractor would have about 14 months to get his plant ready and finish his cables. Another suggested reason is that the requirement of acid open hearth steel has kept out several bidders. Another very obvious reason is that everybody is tremendously busy.

The Chicago & Alton Shops at Bloomington.

The Chicago & Alton is making plans and estimates for extensive improvements in its shops at Bloomington, Ill., and quite likely about $200,000 will be spent. The changes include a new car shop, a central power and lighting and heating plant, and the use of electricity for driving the shop machinery. The idea is to use the present shafting in the different shops, but divide it up into sections of approxi-

mately equal driving power, each section to be run by an electric motor. The new equipment needed will be some large electric cranes, many new shop tools, water tube boilers, engines, generators, motors, and automatic stokers and machinery for handling the coal and ashes in the boiler house; either a system of steam or hot water heating will be used. In addition to lighting the shops, arc lamps will be placed about the station throughout the Bloomington yards and at street crossings.

Electric Turn Tables.

The Cleveland, Cincinnati, Chicago & St. Louis will install an electric lighting plant at its Bellefontaine shops, and the transfer table and turntable will be equipped with motors so as to be operated electrically. Later, some of the larger tools in the blacksmith and boiler shops may be driven by electric motors.

Rail Steel in Sweden.

According to observations made during the last few years on the Swedish State Railroads, the yearly average number of broken rails is 26, or in other words, there is one broken rail to every 91 miles of track. Not in a single instance has a broken rail caused any accident in Sweden, because the rail has never broken in more than two pieces. This is ascribed to the soft steel used in the Swedish rails, which never contain over 0.45% of carbon, besides unusually small quantities of manganese, silicon and phosphorus. Recent American practice favors the use of considerably harder rails with a carbon percentage of from 0.5 to 0.6. Drop tests conducted in Sweden have shown that rails of 80 lbs. per yard with a carbon percentage of 0.45, will stand a blow of 2,204.6 lbs. hammer with a 19.7 ft. drop, while the same size rails with 0.6% carbon will break in several pieces under a 1,102 lbs. hammer falling from the same height. Evidently there is something the matter with these Swedish high Carbon rails.

Rail Specifications and Tests.

A German investigator, Mr. D. Miller, has made public the results of a large number of tests of steel rails for the purpose of calling attention to the unreliability of the various specifications in force, and also to the necessity of further experimenting with a view of bringing about a final understanding as to the best specifications and methods of tests founded on actual facts. Mr. Miller reviews in this connection former experiments with steel rails, especially those of Professor Tetmayer, President International Society for Testing Material, and Mr. Ast. Mr. Miller has found that a certain amount of silicon is advantageous, as it increases the resistance of the rails, particularly against flattening of ends at the joints. Special importance is attached to the resistance at the yield point, while the ultimate tensile strength, which has heretofore been the most prominent factor, is considered unimportant. An explanation for this preference may be found in the fact that the deformation, like the flattening of the ends, does not begin until the yield point is reached. Mr. Miller suggests that if a rail passes the drop test satisfactorily, it should also be put through a cross-bending test. He recommends a moderate drop test of 1,500 kilogramme-meters (10,850 foot-pounds) momentum as a preliminary test, followed by a bending test in which the load should be raised to a few tons above the yield point. At the yield point the rail must stand 4,200 kilogrammes per square centimeter (59,700 lbs. per square inch) to be accepted.

Westinghouse Air Brake Company.

At the November meeting of the Directors of the Westinghouse Air Brake Company Mr. H. H. Westinghouse was elected Vice-President, Mr. E. M. Herr, General Manager, and Mr. J. F. Miller, Assistant Secretary.

Acetylene Lights for Passenger Cars.

The Cornwall & Lebanon Railroad is now using acetylene gas in passenger cars, in some of which this illuminant has been in use about five months. One locomotive headlight is also lit with acetylene. The burners are rated at ¼ ft. per hour, but nearly ½ ft. is used. The gas is compressed, and is carried in the tanks formerly used on the same cars for ordinary illuminating gas. President A. D. Smith informs us that his experience with acetylene has thus far been satisfactory.

Interlocking.

The Standard Railroad Signal Company has contracted to build, for the Erie Railroad, at Henderson and Grove streets, Jersey City, N. J., a low pressure pneumatic interlocking plant, the machine to have about 64 levers.

Pneumatic Tools.

The Q & C Company issues the following circular: "We notice in recent issues of the railroad and mechanical press, reference to a circular issued jointly by two manufacturers of pneumatic tools, in which they state that the patents controlled by them cover the fundamental principles of pneumatic hammers, without the combined use of which no successful pneumatic hammers can be made. We do not at this writing desire to express any opinion as to the accuracy of this statement when applied to valved hammers, but it is absolutely misleading and damaging to our interests in its present form. The valveless hammers manufactured by us are not in any way an infringement of the patents they refer to, or any others."

THE SCRAP HEAP.

Notes.

A Philadelphia paper reports that a section of train No. 7, consisting of six mail cars and a sleeper, was recently run over the Pennsylvania Railroad from Morrisville, Pa., to Kauffmans trough, 90 miles, with one tank of water, the supply at the intermediate trough having temporarily failed.

Philadelphia papers report that on January 1, when the pensions go into effect on the Pennsylvania Railroad, about 1,000 employees will be retired at various points east of Pittsburgh and Erie. It is said that each man's pension will be a certain percentage of the average amount of his annual salary for the 10 years next preceding his retirement. The regulations for retiring at the age of 70 apply to officers of the company and to clerks in the general offices, as well as to employees on the road.

The Burlington fast mail has now been traveling at 60, 70 and 80 miles an hour for so many months that its performances have become commonplace; but mention is made in Western papers of a recent run from Mendota to Chicago, 83 miles, in 76 minutes, which is said by an officer of the road to be the best time ever made between those two points. The train ran from Mendota to Aurora, 46 miles, in 39 minutes. The engine on this run was No. 1592. There was a considerable head wind nearly all the way from Burlington; but the run, 206 miles, was made in 209 minutes, including all stops.

At Washington last week Assistant Attorney-General Boyd listened to arguments presented by the American Bankers' Association on the question of taxing express companies as brokers under the war revenue act. It was claimed that the express companies, in their money order departments, do a foreign exchange business which, under the law, ought to subject them to a tax of $50 a year at each office where such business is done. Representatives of the Adams and the Wells-Fargo expresses made counter arguments. If the express companies are liable to this tax the telegraph companies are also; and to impose a tax of $50 on each of the 104,000 offices of these companies would be absurd. In large areas of country, where banks are few, business men depend almost entirely on the express and telegraph companies for the transmission of funds.

A. L. Ackley, Superintendent, and H. J. Hill, Chief Train Despatcher of the Taunton Division of the New York, New Haven & Hartford, have been indicted by the Federal Grand Jury at Boston on the charge of unjustly discriminating against a telegraph operator, P. J. Galligan. Galligan claims that he was threatened with dismissal because he belonged to the Order of Railroad Telegraphers. He was discharged from the service of the road last April and his brotherhood is making of this a test case in the court. This indictment is under the arbitration act passed by Congress June 1, 1898. By Section 10 of this act any interstate railroad threatening an employee with loss of employment or unjustly discriminating against him because of his membership in a labor association is declared guilty of a misdemeanor, which subjects the offender to a fine of not more than $1,000.

Pressed Steel Cars Abroad.

One hundred steel cars for use on the Egyptian railroads have been shipped by the Pressed Steel Car Company and 300 more will be forwarded next week. A. Knapp and Col. Ivanoff, of St. Petersburg, are now in Pittsburgh in connection, it is reported, with the desire of the Russian Government to obtain 20,000 freight cars and a large number of locomotives from the works of this country for the new Trans-Siberian and other lines. The French Government is likewise seeking to place contracts for cars with American manufacturers. The Pressed Steel Car Company is rapidly placing itself in position to fill a large share of these orders. President Schoen and General Sales Agent Brady will sail next month to establish an agency in London for the better communication with their British and continental trade. It is but fair to presume that the company's pressed steel car plants, which now are capable of producing about 80 cars per day, will be obliged to materially enlarge their capacity to meet a growing demand, both foreign and domestic. At McKees Rocks, where but a year ago there was nothing but trees and shrubbery and garden patches, the traveler along the Ohio River now sees enormous factories and dozens of neat houses for the workingmen. And it is but a scant three years since the first steel cars were placed in service on the Bessemer road.

East St. Louis Relay Depot.

The Agreement for the organization of the East St. Louis Relay Passenger Association is now being signed by the various railroad companies. Nothing will be done relative to building the new station until all the lines have signed the agreement, and when this is done, the Association will organize, elect officers, and doubtless appoint a Building Committee. Clarence R. Parker, St. Louis Agent for the Illinois Central, is President of the Association. The executive office is 1,300 Union Trust Bldg., St. Louis.

The Luxury of Travel.

The trains with barber shops, bath-rooms, ladies' maids, etc., still lack one accommodation, for the introduction of which credit is due to the Russian Imperial family. The Czar has three little daughters, whose chief nourishment so far consists of milk. Experts in rearing babies commend the use of the milk of one and the same cow, and this the little czarinas have not only at home, but on their travels. They were taken on a recent visit of their parents to the Emperor of Germany, and in the imperial train was a palatial stable car, clean as a Dutch kitchen, and in this car two stately Holstein cows, who supplied milk, fresh and warm and of uniform quality, as the children required it. But about the time the two emperors fell on each other's necks in the Potsdam station, the awed spectators were somewhat startled to hear a lusty "moo" from the train which had just brought the Czar.

Live Stock Damages in France.

In January, 1898, on the line of railroad from Paris to Brest, an ox broke out of an inclosed pasture, made his way through the fence along the railroad, ran along the track, came into collision with a freight train, threw it off the track, killing the conductor, and was killed himself by the shock. And then the owner of the beast recovered from the railroad the value of a thoroughbred animal. My dear sir, they do these things better in France. A local court, in the first place, fined the farmer 16 francs for not keeping his fence in order. Another court decided that he must pay 6,948 francs and 65 centimes for the damage done to the railroad track and rolling stock; and the widow of the dead conductor has sued him for 30,000 francs for the loss of her husband. The landowners in the neighborhood have been so alarmed that they have formed a "Society for Defence Against the Encroachments of the Western Railroad." Whether they have looked to their fences does not appear.

A Fast Run on the Lake Shore.

A special newspaper train from New York on December 10th made a run on the Lake Shore & Michigan Southern between Buffalo and Cleveland, a distance of 183 miles, in 188 minutes. The fastest time was made between Buffalo and Erie, the train leaving Buffalo at 11.39½ a. m. and arriving in Erie at 12.58 p. m., 78½ min., or at an average speed of 67¼ miles an hour. From Buffalo Creek Crossing, just outside of Buffalo to the Philadelphia & Erie Crossing, just outside of Erie, a distance of about 85 miles, the train maintained an average speed of 70 miles an hour. Between Northeast and P. & E. Crossing, about 14 miles, the train ran at the rate of 84 miles an hour; between Angola and Silver Creek, 10 miles, at 75 miles an hour, and between Dunkirk and Northeast at 68½ miles an hour. When the train reached Erie orders were received directing that the distance between Erie and Cleveland should not be traversd in less than 1 hour 45 minutes. The train consisted of engine No. 608, one of the last lot of eleven from the Brooks Locomotive Works, two baggage cars and one coach.

Damage from Electrolysis.

The question of injury to water pipes by electrolysis has again been brought up in Chicago by the bursting of two mains. Recently a 6-in. water main in Larrabee Street, 9 ft. below the surface and directly under an electric car line, burst and when uncovered the pipe was found badly damaged by electrolysis; the pipe was laid about 14 years ago while the electric road has been working about five years. The second place was in Elm Street, and the conditions were similar to those first named, that is, the water pipe was 9 ft. underground and beneath car tracks over which electric cars had been run for four or five years; in that case the main was 8 in. in diameter.

New Ore Dock at Duluth.

Work on the third ore dock of the Duluth, Missabe & Northern at Duluth will be commenced this winter by Barnett & Record. Only half of the dock will be completed this winter, for which 2,500,000 ft. of lumber, chiefly fir, will be needed. There will be 2,336 ft. of pocket frontage, one-half on each side. The foundations in some places will be 60 ft. below the surface of the water, while the structure on which trains will run to reach the vessels will be 65 ft. above the water line.

Cocoa-nut Fibre Snow Fences.

A firm in Dresden offers to the railroads a novel kind of fencing against drifting snows, consisting of cocoa-nut matting, or rather netting, the meshes being about 1½ in. wide. The mats are made usually 4 x 1½ meters, or 13 x 5 ft., and are lashed at the ends to posts, which may be old ties, with truss ropes at top and bottom. These fabrics, it is said, offer very little resistance to the passage of light and air, but almost perfectly arrest snow-flakes, and do not decay when wet nor break when dry. In summer they may be rolled up and stowed away; they are offered at 1.2 marks per square meter, which would amount to about $2.25 per rod of the 5-ft. height. The steel makers may drive us to this material.

Chicago Street Railroads.

It was officially announced in Chicago a week ago that the Chicago Union Traction Co. has arranged to buy the Yerkes interests in the Chicago Consolidated Traction Co., and it is understood that the papers will be signed this week and that the transfer will be effective Jan. 1. The Chicago Consolidated Traction Co. was formed in February last, the details being given in our issue of Mar. 17, p. 200. It consists of a number of feeder lines to the North and West Chicago Street Rys., and its purchase gives the Chicago Union Traction Co. full control of the surface lines on the North and West sides of the city. Mr. Yerkes' interests in the Northwestern and Lake St. Elevated are not included in the sale, but it is said that negotiations are under way for the acquirement by the Chicago Traction Co. of the Suburban RR., which operates 30 miles of track west of the city and serves as a feeder to the Metropolitan and Lake St. Elevated roads. These purchases by the Chicago Union Traction Co. give that company control of a very large mileage, which, including the Suburban RR., is as follows: Mileage, single track, cable, 48.54; electric, $476.66; horse, 7.54; total, 532.74.

Chicago River Improvement.

The annual report of Major W. L. Marshall, Corps of Engineers U. S. A., who was until recently U. S. Engineer at Chicago, gives a comprehensive account of the improvements necessary in the Chicago River before the channel can be dredged to 21 ft., the depth adopted for its improvement. The report is illustrated by 30 maps, drawings and photographs describing the condition of the river at present. The report shows that three serious difficulties are to be overcome before the dredging can be accomplished. First the three tunnels over which the river is only 16 ft. deep must be removed by the city. Second, the center pier bridges must be replaced with modern bascule bridges, also at the expense of the city. Third, many old wharves and docks must be rebuilt before dredging is done, or they would be undermined and collapse. As it has

been decided that the Government will not do any of this work, no estimates of cost are given. The cost of the simple dredging of the river is given at less than $1,000,000, unless the city insists on having dredgings dumped 8 miles out in the lake, which would make the cost much greater.

Pintsch Gas for Car Lighting.

The Safety Car Heating & Lighting Co. informs us now that 2,137 palace cars of various sorts and nearly 12,00 coaches running in the United States are equipped to use Pintsch gas and that there are more than 50 plants in various cities of the country for making and compressing the gas. At the last annual convention of the State Railroad Commissioners of the United States a report was made saying that at the end of the year 1898, 91,890 cars were equipped for Pintsch gas, of which 34,325 were in Germany, 17,800 in England, 5,210 in France, 3,711 in Austria, 6,458 in India and 1,000 in Australia.

New Railroads for Russia.

U. S. Vice and Acting Consul Monaghan writes from Chemnitz, on Oct. 25,, that Russia has sent engineers to the left bank of the Ural River to survey for a railroad from Orenburg southeast across Turkestan to Taschkent. Another line is to run from Alexandrowo through the Trans-Caspian country along the left bank of the Amoo to Tchardschin. These roads are designed to develop the cotton producing countries of Turkestan, Bokhara and Khiva.

Lackawanna Dining Cars.

The Delaware, Lackawanna & Western has two handsome new dining cars, made by the Barney & Smith Car Co., of Dayton, O. These cars have 19 seats on one side of the aisle and 10 on the other. Above the buffet is a dome of art glass, in the interior of which a light is always kept burning. The ceilings of these cars are dome shape and the openings for the deck lights are covered with screens so as to preserve the appearance of an unbroken semicircular roof. The interior finish of the cars is of dark mahogany inlaid with white mahogany, tulip and other colored veneers. The kitchen and pantry are finished in cherry. In the long passage which leads past the kitchen are four oval windows fitted with glass of different colors.

Master Car Builder Canfield informs us that these cars are to be lighted by electricity, with the apparatus of the Axle Light & Power Co., of New York, and that in warm weather electric fans will be provided.

The Northwestern Elevated, Chicago.

The Committee on Railroads of the Chicago City Council held a meeting on Dec. 9 to consider the application of the Northwestern Elevated (noted in this column last week) for an extension of time to complete the road. The petition was refused, except on conditions provided for in a substitute ordinance which is proposed in place of the old ordinance which expires Dec. 31, 1899. The new ordinance proposed provides for increased compensation to the city, and that the ordinance shall not take effect until the Union Elevated Loop Co., owned by the same parties, has paid the compensation due the city which was recently refused; and further, that if the Loop in the future refuses to pay the compensation, such refusal shall act as forfeiture of the extension ordinance. It is also provided that unless the Northwestern Elevated is extended from Wilson Ave. to the city limits within 5 years, its bonds of $100,000 held by the city shall be forfeited, and failure to complete the road from the Loop to Wilson Ave. by Oct. 1, 1900, will also forfeit the bond. It is also provided that the elevated structure cannot be used by any other company than the Northwestern Elevated.

Surface Road Extensions in New York.

The Board of Directors of the Third Avenue Railroad Co., New York, have accepted the terms proposed by the Board of Estimate and Apportionment for the King's Bridge, Fort George and Eleventh Ave. railroad franchises, which covers about 16 miles of road in the northern part of the city. These terms are 4 per cent. of the gross receipts for the first five years of the term of the franchise; 6 per cent. for the second five years; 8 per cent. for the third five years, and 10 per cent. for the remainder of the term. The franchise covers 25 years, at the end of which term there must be a reappraisement; at the end of 50 years the franchise reverts to the city. The Third Avenue company is building a $2,000,000 power house at 210th Street and Kingsbridge Road. It is intended to charge a five-cent fare, and transfer arrangements will be made. The country through which the roads pass is not built up.

A Good Story whether True or Not.

This is related concerning Mr. C. P. Huntington and the Newport News Shipyard: "The other day a strike was threatened. He sent for the heads of all the departments and asked them to pick out a delegation of the fairest minded workmen. Then he told the delegation that it was possible that they were not getting fair wages, and he proposed that they settle the question to their own satisfaction by going to all the shipbuilding plants along the Delaware River. The men put on their best clothes and went away, proud of the fact that they didn't have to sneak into the shipyards they wished to visit. Wherever they went they had the privilege of getting inside information, and when they returned they told Mr. Huntington that they had seen for themselves; they were satisfied that they were getting as good pay as any one, and that their surroundings were even more pleasant than the shipyards they had visited. They said they wanted to go back to work."

South American Notes.

A call has been issued for proposals to supply the Central Railroad of Brazil (State owned) with 125,000 tons of coal for delivery in 1900. The Central Railroad buys its coal on assay, with limits as to composition and calorific power definitely fixed.

The past summer, which is the winter of Argentina and Chile, has been marked by extraordinary floods in those republics, causing enormous damage to crops and suspending railroad communication in many places. The Neuquen extension of the Buenos Ayres Great Southern Railroad was cut in several places just as it was about to be thrown open to traffic. In Chile the entire southern section of the State Railroads was rendered useless, and communication between Valparaiso and Santiago was cut off for a time. Extensive orders for renewals of permanent way and bridges are being placed by railroads in both countries.

The Argentine Government has granted a concession to Mr. George Mallison for a railroad from Parana de las Palmas to Trenque Lauquen. The line will touch Salta, Junin and Lincoln, and will have port facilities at Baradero.

The Argentine Government has ordered 1,000 kilometres (621 miles) of Decanville rails for light railroads extending into the territories of Chaco and Neuquen. The object is to further colonization. It is interesting to note that the recent Neuquen extension of the Buenos Ayres Great Southern Railroad marked a new departure in South American railroad development, the rails being laid into a new country where the demand for transportation facilities was yet to arise.

Lake Notes.

The new freight steamer Admiral recently launched from the Wyandotte yards of the Detroit Shipbuilding Co., is a duplicate of the steamer Angeline, described some time ago. The Admiral has been chartered by the Rockefeller interests and will be used as an ore carrier next season.

LOCOMOTIVE BUILDING.

The St. Louis & San Francisco will, it is reported, order 10 or 12 locomotives.

The Union has ordered four engines from the Pittsburgh Locomotive & Car Works.

The Calumet & Hecla is having one engine built by the Baldwin Locomotive Works.

The Brooks Locomotive Works are building four engines for the Indianapolis Union.

The Cooke Locomotive & Machine Works are building one engine for the Colorado & Southern.

The Terre Haute & Indianapolis has ordered three engines from the Pittsburgh Locomotive & Car Works.

The Schenectady Locomotive Works are building three engines for the Chicago, St. Paul, Mineapolis & Omaha.

The Chesapeake & Ohio has placed an order with the Richmond Locomotive & Machine Works for 25 consolidation locomotives.

The Baldwin Locomotive Works are said to have an order for two locomotives for the Richmond, Fredericksburg & Potomac.

The Lehigh Valley has ordered two locomotives from the Baldwin Locomotive Works in addition to those noted Nov. 24, making seven in all.

The Seaboard Air Line has ordered the engines referred to last week, giving 25 10-wheelers to the Richmond Locomotive & Machine Works, 15 eight-wheel passenger engines to the Baldwin Locomotive Works and 10 engines to the Rhode Island Locomotive Works (International Power Co.).

We are officially informed that the Cleveland, Cincinnati, Chicago & St. Louis may not order the consolidation locomotives on which it has been figuring, owing to high prices, unless increased business makes more motive power absolutely necessary. The present traffic can be handled by working the shops of the road full time.

The Richmond Locomotive & Machine Works have received an order from the Rio Grande & Western for eight more consolidation locomotives. Four of these will weigh 183,500 lbs., with 165,500 lbs. on drivers, and have 22 in. x 28 in. cylinders, 51-in. drivers, extended wagon top boilers, working steam pressure 200 lbs., 320 tubes 13 ft. 9 in. long, with an outside diam. of 2½ in.; fireboxes, 122 in. long and 41 in. wide, and a tank capacity for 5,000 gals. of water. The other four will weigh 190,000 lbs., with 172,000 lbs. on drivers, and have 22 in. x 28 in. cylinders, 56 in. drivers, extended wagon top type boilers, working steam pressure 200 lbs., 320 tubes 14 ft. 2½ in. long, with an outside diameter of 2¼ in.; fireboxes, 121⅝ in. long and 41⅜ in. wide, and a tank capacity for 5,000 gals. All the engines are for May, 1900, delivery.

The Southern has ordered the 41 locomotives referred to last week from the Richmond Locomotive & Machine Works. The order calls for two 10-wheel passenger engines with 19 in. x 26 in. cylinders and 69 in. driving wheels and to weigh, in working order, 134,500 lbs., with 98,500 lbs. on the driving wheels; four 10-wheel passenger engines with 20 in. x 26 in. cylinders, 70 in. driving wheels and boilers 62 in. in diam. to carry a working steam pressure of 200 lbs. and to weigh 154,000 lbs., with 115,000 lbs. on the driving wheels; four 10-wheel passenger engines, with 21 in. x 28 in. cylinders, and 72 in. driving wheels, and to weigh 156,000 lbs., with 116,900 lbs. on the driving wheels; six consolidation freight engines with 20 in. x 26 in. cylinders and 58 in. driving wheels and to weigh 143,500 lbs., with 124,900 lbs. on the driving wheels; and 25 consolidation freight engines with 21 in. x 28 in. cylinders and to weigh 151,500 lbs., with 133,600 lbs. on the driving wheels.

The Pittsburgh Locomotive & Car Works are building seven simple 10-wheel freight engines and one simple consolidation engine for the Duluth, Missabe & Northern. The freight engines will weigh 123,000 lbs., with 100,000 lbs. on drivers, and have 19 in. x 26 in. cylinders; 56 in. drivers, straight top boilers, radial stay fireboxes, working steam pressure 175 lbs., 240 charcoal iron tubes 12 ft. 5½ in. long and 2 in. in diam.; steel fireboxes, 108 in. long and 34⅜ in. wide; tender capacity, 3,600 gals. of water and eight tons of coal; cast iron truck and tender wheels and driving wheels with cast iron centers and Latrobe tires. The consolidation engine will weigh 180,000 lbs., with 164,000 lbs. on drivers, will have 22 in. x 28 in. cylinders; 56 in. drivers, straight top boiler, radial stay firebox, working steam pressure 185 lbs.; 272 charcoal iron tubes 14 ft. 11 in. long and 2½ in. in diam.; steel firebox, 121 in. long and 426 in. wide; tender capacity, 5,000 gals. of water and eight tons of coal. All the engines will have Westinghouse air brakes, iron axles, National hollow brake beams, Congdon brake shoes, Chicago couplers, Monitor injectors, Jerome piston and valve rod packings, Ashcroft safety valves and steam gages, Nathan lubricators and French springs.

The Hocking Valley has placed an order with the Brooks Locomotive Works for five simple six-wheel switching engines and six simple eight-wheel passenger engines. The switching engines will have B. L. W. improved piston valves, will weigh 113,000 lbs., and have 19 in. x 26 in. cylinders, 50 in. drivers, Belpaire boilers, working steam pressure 180 lbs., 225 steel tubes 11 ft. 1⅛ in. long, with an outside diameter of 2 in.; steel fireboxes, 97 in. long and 33 in. wide, and a tank capacity for 4,000 gals. of water. They will be equipped with New York air brakes, steel axles, Sterlingworth brake beams, Buckeye couplers, Jerome piston and B. L. W. valve rod packings, Coale safety valves, Leach sanding devices, Michigan lubricators, French springs, cast iron tender wheels, and steeled cast iron wheel centers. The express passenger engines will weigh 124,000 lbs., with 84,000 lbs. on drivers, and have 18 in. x 26 in. cylinders, 72 in. drivers, 62 in. Belpaire boilers, a working steam pressure of 180 lbs., 300 steel tubes, 11 ft. 7¼ in. long and 2 in. in diam.; steel fireboxes, 108 in. long and 42 in. wide; tank capacity for water, 5,000 gals. They will be equipped with New York air brakes, hammered iron axles, Monarch brake beams, Buckeye couplers, Jerome piston and valve rod packings, Coale safety valves, Leach sanding devices, French springs, Standard driving wheel tires, cast iron plate tender wheels and cast steel wheel centers made by Pratt & Letchworth Co. The road has also ordered 10 consolidation and five heavy switching engines from the Baldwin Locomotive Works.

CAR BUILDING.

The St. Louis & San Francisco is getting prices on about 400 box cars.

We understand that the Chicago & Alton will order no more cars at present.

The Southern has ordered 30 cars for passenger service from the Pullman Co.

The Mather Stock Car Co. has ordered 31 cars from the American Car & Foundry Co.

The Seaboard Air Line has ordered 200 box cars from the South Baltimore Car Works.

The Canadian Pacific is said to have ordered 200 cars from the Barney & Smith Car Co.

The Continental Fruit Express has ordered 55 cars from the American Car & Foundry Co.

The Sierra R.R. of California has ordered 20 cars from J. Hammond & Co., of San Francisco.

The Jackson & Sharp Co. are building two passenger cars for the Atlantic & North Carolina.

The Cleveland, Lorain & Wheeling has ordered 50 side dump cars of 80,00 lbs. capacity from the Pullman Co.

The Merrill & Ring Lumber Co. has ordered 40 logging cars from the Russell Wheel & Foundry Co. of Detroit.

The Delaware, Lackawanna & Western has placed an order for two passenger cars with the Barney & Smith Car Co.

The Delaware & Hudson Canal Co. has ordered 12 first class passenger coaches from the American Car & Foundry Co.

It is reported that the Huntington & Broad Top Mountain has ordered 250 freight cars, but we have no official information.

The Pecos Valley & Northeastern has ordered from the Barney & Smith Car Co. the 300 stock cars referred to in our issue of Nov. 24.

The Chesapeake & Ohio has ordered 1,500 of the coal cars referred to Nov. 24 from the Pullman Co. They will be of 80,000 lbs. capacity.

The Southern last week placed orders for 650 box cars with the American Car & Foundry Co., and for 1,000 coal and flat cars with the Southern Car & Foundry Co.

The Baltimore & Ohio Southwestern is considering buying box, flat, and coal cars, but nothing has been definitely settled relative to the number or time of placing orders.

The Oregon Short Line is considering ordering several hundred freight cars and a few passenger cars, but nothing definite has been decided yet, and probably no decision will be reached until early in January.

The American Car & Foundry Co. is said to have orders from the Wabash for 20 cars, and from the New Mexico Railway & Coal Co. for 89 cars of different kinds.

Officials of the Southern Indiana inform us that that road is now receiving the cars ordered last summer from the Barney & Smith Car Co., as we noted at the time, but that the road has placed no orders for cars recently, as reported by some of the railroad papers.

We are officially informed that the Burlington, Cedar Rapids & Northern has ordered no cars recently, as reported by one of the railroad papers last week. In July last this road ordered 400 box cars and 60 Rodger ballast cars, which were noted in this column at the time.

The Worcester (Mass.) & Suburban Street Railroad wants some new open cars.

The Worcester (Mass.) Consolidated Steel Railroad has ordered 10 open and 10 closed cars from Osgood Bradley & Sons.

The Union Traction Co., Chicago, will build about 150 trolley cars at its West Side shops during the winter, for which plans have been prepared. They will be double truck cars, 45 ft. long and to seat 75 people.

BRIDGE BUILDING.

ALLENTOWN, PA.—Viewers have been appointed for a new county bridge over the Lehigh River from Hamilton St., Allenton, to Hanover. It is estimated that the bridge will cost $500,000.

BRECKSVILLE, O.—The Osborn Co., civil engineers of Cleveland, are preparing plans and specifications for a new steel bridge for Cuyahoga County. Bids will be wanted as soon as the plans are ready.

GAHANNA, O.—The Franklin County Commissioners propose to build a bridge over Big Walnut Creek,

with two spans 168 ft. each, at a cost of $30,000. Henry Maetzel, County Engineer, Columbus.

CHICAGO, ILL.—The City Council, Dec. 4, ordered the city authorities to have the Canal and Halsted St. viaducts repaired immediately at the expense of the Chicago & Northwestern and Chicago, Burlington & Quincy Railroads.

A resolution was also adopted calling upon the Union Traction Co. to repair at once the Center Ave. viaduct.

CLEVELAND, O.—James Ritchie, City Engineer, has recommended to the Council a rolling lift bridge, similar to that now being built by the Big Four near Columbus and British Sts. The proposed structure is to replace the Middle Seneca bridge and is to be 140 ft. long. The Council has given the first hearing for an appropriation of $100,000.

COLUMBUS, O.—A bill has been introduced in the Council requiring the City Engineer to make plans and estimates for a viaduct across the Hocking Valley and the T. & O. C. RR. on South High St., and West Broad St.

CRAWFORDSVILLE, IND.—The County Commissioners, according to report, will build a bridge over Black Creek, fo which plans and specifications have been ordered. Wm. M. White, County Auditor.

DENVER, COL.—A. J. McCune, State Engineer, will receive bids until Dec. 30 for a combination bridge 280 ft. long to cross the Grand River one mile from Dotsero, on the Denver & Rio Grande. There will be one span of 180 ft. and two spans of 50 ft. each, with 14-ft. roadway.

EASTON, PA.—The Lehigh Bridge Co. will apply on Dec. 28 for incorporation to build a bridge across the Lehigh River from Adamson St. to a point at or near Packer St. Those interested are Wm. Coyle, Geo. F. Coffin and Harry H. Haines.

EUCLID, O.—Plans and specifications are being prepared by the Osborn Co., civil engineers of Cleveland, O., for a bridge at this place for Cuyahoga County.

HOBOKEN, N. J.—We are informed that the Delaware, Lackawanna & Western is considering replacing the present drawbridge with a new bridge across the Hackensack River west of the Hoboken Tunnel. Plans will soon be submitted to the War Department.

KANKAKEE, ILL.—The Board of Local Improvements will soon receive bids for a 600-ft. bridge across Kankakee River, at a cost of $40,000. Robert D. Gregg, City Engineer, prepared the specifications.

KANSAS CITY, MO.—The Belt Ry. Co. will build a steel bridge at McGee St. Other bridges are in contemplation.

KESWICK, CAL.—W. O. Blodgett, County Clerk and ex-Officio Clerk of the Board of Supervisors, informs us that a bridge to be built by Shasta County over the Sacramento River will be a combination Howe truss, having one span of 140 ft., two spans of 90 ft. each, and 20 ft. of approach on each end. The cost is not to exceed $15,000, and bids will probably be received by the Clerk of the Board at Reading about May 10.

MALVERN, ARK.—The bridge proposed across the Ouachita River will be built at Rockport. D. S. McCray may be addressed.

NEW HOPE, CAL.—The Sacramento & San Joaquin Valley Ry. will need one drawbridge 180 ft. long and one other steel bridge about 100 ft. long on the proposed line. Arthur Thornton may be addressed.

NEW YORK, N. Y.—A hearing will be held in the Army Building Dec. 15 on the application made to the Secretary of War for the approval of plans for the two proposed East River bridges. The Board of Aldermen have authorized the Bridge Commissioner to make contracts for the soundings and borings for the two bridges. An appropriation of $1,000,000 has already been made for this work.

NIAGARA FALLS, N. Y.—Three new steel bridges will be built on the Niagara Gorge Ry., according to report. One is to replace a wooden trestle near Lewiston.

NORFOLK, VA.—The syndicate in which R. Lancaster Williams of Richmond is interested, will need a bridge across the Elizabeth River from Main St., Norfolk, to Berkeley, on a new railroad.

NORTHAMPTON, MASS.—An ordinance requiring the City Engineer to procure estimates and bids for the new bridge to be built over Mill River was approved Dec. 5.

OTTAWA, ONT.—Application will be made to the next session of the Canadian Parliament for a renewal of the charter to build the bridge between Ottawa and Hull at Bank St.

PHILADELPHIA, PA.—The Council's Committee on Surveys, under the appropriation of $600,000 for new bridges, proposes two new bridges at Wyoming Ave. and Frankford Creek, to cost $100,000, and two bridges at Frankford Ave., over Frankford Creek, costing approximately $90,000.

PROVIDENCE, R. I.—The Consolidated Road has submitted plans to the Harbor Commissioners for a new 227-ft. drawbridge at Indian Point.

RIVERSIDE, ORE.—Reports state that a bridge will be built over the Willamette River at or near this place to Clackamas County.

ST. JOHN, N. B.—A steel drawbridge, 130 ft. over all, will be built over the Lancaster River at Musquash, St. John, for the Shore Line Ry. Weldon & McLean will receive offers for building the superstructure, and will supply plans, etc., on application.

ST. CATHERINES, ONT.—The Board of Works has recommended that the bridges spanning the Niagara Central and Grand Trunk tracks at Queenston St. be replaced by new structures.

SAN JOSE, CAL.—Curtis M. Baker, City Engineer, will prepare plans and specifications for the proposed bridge across Canoas Creek on King St.

SPOKANE, WASH.—The Great Northern Ry. will build seven iron bridges over the tracks west of Monroe St., at Maple, Oak, Elm, Chestnut, Nettleton, and Cochrane streets and at the Boulevard. See also "Other Structures."

TISKILWA, ILL.—The lowest total bid received for the four single track and one double track steel highway bridge over the Illinois & Mississippi Canal at this place and at Wyanet was $15,000, by the Massillon Bridge Co. The highest total bid was $20,500.

TOLEDO, O.—It is estimated that a bridge from Jefferson St. across the river would cost $600,000. A tunnel is suggested. W. F. Brown, City Engineer.

WASHINGTON, D. C.—It is announced that A. E. Randle, formerly President of the Capital Traction Co., proposes to build a railroad to Chesapeake Beach which will need a bridge over the Easton Branch, for which he owns a charter.

A bill was introduced in the House of Representatives Dec. 5 to build the proposed Memorial bridge across the Potomac River from Washington to the National Cemetery at Arlington. The sum of $1,500,000 is asked for this purpose. The engineers selected to make competing plans for the bridge are George S. Morison, Leffert L. Buck, William H. Burr and William R. Hutton. (July 21, p. 529.)

The Washington Traction & Electric Co., authorized, according to reports, at a meeting last week the expenditure of $250,000 for seven buildings on the line of the Great Falls St. Ry. The bridges are to replace wooden structures.

Other Structures.

ALBANY, N. Y.—The Delaware & Hudson has filed plans with the Department of Public Buildings for a new shed on Vine St. between Dallius and Green Sts. A storehouse 50 x 30 ft. and a repair shop are proposed.

BUFFALO, N. Y.—The Lehigh Valley RR. Co. has filed with the Building Department plans for a freight house and transfer shed on Dingen St. The shed will be 520 x 53 ft., and will cost $12,000.

CLEVELAND, O.—The Suburban Electric railroads running into Cleveland are considering building a union station in that city.

COATESVILLE, PA.—The Lukens Iron & Steel Co. has had plans prepared for three large mills to be built on the west side of Brandywine Creek, opposite the old works.

DENVER, COL.—The Denver & Rio Grande RR. paint shops at Burnham were destroyed by fire Dec. 2, causing a loss of about $35,000.

HAMPSTEAD, MD.—Reports state that the Western Maryland RR. will build a new passenger station at this place.

McKEE'S ROCKS, PA.—Reports state that the Pittsburgh & Lake Erie RR. is now receiving bids for a new round house of 32 stalls, to be built at McKee's Rocks. The building will have a steel frame.

MILWAUKEE, WIS.—Changes will be made at the Bay View rolling mills of the Illinois Steel Co., estimated to cost $3,500,000. Six or eight additional mills, also converters, will be built. Work will be begun in the spring, and it will probably take about two years to complete it.

NEW CASTLE, PA.—The Western New York & Pennsylvania RR., and the Pittsburgh & Lake Erie contemplate building a union station.

NEW YORK, N. Y.—The Sinking Fund Commission Dec. 6 approved the plans of the Department of Docks & Ferries for the nine new piers on the East River front, from Whitehall St. to Wall St. It is intended to expend $7,000,000 for this purpose. The new piers will be from 45 to 80 ft. wide and will have an average length of 580 ft.

PLAINFIELD, N. J.—The Lehigh Valley RR. proposes to build repair shops on property bought some time ago in Newmarket.

SPOKANE, WASH.—The new passenger station proposed by the Great Northern will be on the island between Washington and Howard Sts. Access will be made to it by a steel bridge on Washington St. and another steel bridge will connect the structure with the Howard St. bridge across the south channel of the river. The depot is to be 350 ft. long and 50 ft. wide and two stories high. The first floor will include the waiting rooms, ticket office, baggage rooms, etc., while the second floor will be given up to the offices of the Spokane Falls & Northern and Great Northern. The present S. F. & N. depot will be abandoned and the present Union depot will be given over exclusively to the O. R. & N. It is understood that the freight shed will be about 50 x 600 ft.

SWISSVALE, PA.—Proposals for new buildings for the Union Switch & Signal Co. will be received at the office of the President, Westinghouse Bldg., Pittsburgh, until Dec. 23, for the new works proposed at this place. The plans and specifications on view after Dec. 12 at the President's office.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Atchison, Topeka & Santa Fe.—Semi-annual preferred, 1½ per cent., payable Feb. 1.

Chicago & Alton.—Preferred, 2¼ per cent.; common, 3 per cent., payable Dec. 27.

Chicago & Northwestern.—Semi-annual, common, 3 per cent.; quarterly, preferred, 1¾ per cent., payable Jan. 5.

Chicago Great Western.—Semi-annual, preferred A, $2.50, payable Jan. 31.

Chicago Junction & Union Stock Yards.—Quarterly, preferred, 1½ per cent.; semi-annual, common, 4 per cent., payable Jan. 2.

Chicago, Rock Island & Pacific.—Quarterly, 1¼ per cent., payable Feb. 1.

Chicago, St. Paul, Minneapolis & Omaha.—Semi-annual, preferred, 3½ per cent.; annual, common, 5 per cent., payable Feb. 20.

East Mahanoy.—Two and one-half per cent., payable Dec. 15.

Little Miami.—Quarterly, 2¼ per cent., payable Dec. 11.

Manhattan.—Quarterly, 1 per cent, payable Jan. 2.

New York & Harlem.—Semi-annual, preferred, 4 per cent., payable Jan. 2.

New York, New Haven & Hartford.—Quarterly, 2 per cent., payable Dec. 30.

Northern Central.—Semi-annual, 4 per cent., payable Jan. 15.

Pennsylvania & Northwestern.—Two per cent., payable Jan. 10.

Providence & Worcester.—Quarterly, 2½ per cent., payable Dec. 30.

Rutland.—Semi-annual, $1 per share, payable Jan. 1.

St. Louis & San Francisco.—Semi-annual, preferred, 2 per cent., payable Jan. 6.

South Side Elevated (Chicago).—One per cent., payable Dec. 30.

Union Passenger Ry. (Phila.).—Four dollars and seventy-five cents, payable Jan. 2.

Meetings and conventions of railroad associations and technical societies will be held as follows:

American Society of Civil Engineers.—Meets at the house of the Society, 220 W. 57th St., New York City, on the first and third Wednesdays in each month, at 8 p. m. C. W. Hunt, Secretary, 220 W. 57th St., N. Y. City.

American Society of Mechanical Engineers.—Meets at 12 W. 31st St., New York City, on the first Tuesday of each month from October to June, except December. F. R. Hutton, Secretary.

Association of Engineers of Virginia.—Holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building, Roanoke, at 5 p. m.

Boston Society of Civil Engineers.—Meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7.30 p. m. S. E. Tinkham, Secretary, City Hall, Boston.

Canadian Society of Civil Engineers.—Meets at its rooms, 112 Mansfield St., Montreal, P. Q., every alternate Thursday at 8 p. m.

Central Railway Club.—Meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 10 a. m. Harry D. Vought, Secretary, 114 Fifth Ave., N. Y. City.

Civil Engineers' Club of Cleveland.—Meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month. Arthur A. Skeels, Secretary.

Civil Engineers' Society of St. Paul.—Meets on the first Monday of each month except June, July, August and September.

Denver Society of Civil Engineers.—Meets at 36 Jacobson Bldg., Denver, Colo., on the second Tuesday of each month except June, July, August and September. W. B. Lawson, Secretary.

Engineers' Club of Cincinnati.—Meets at the rooms of the Literary Club, 25 East Eighth St., on the third Tuesday of each month, excepting July and August, at 6.30 p. m. J. F. Wilson, Secretary, P. O. Box 333, Cincinnati, O.

Engineers' Club of Columbus (O.)—Meets at 12½ North High St. on the first and third Saturdays from September to June. H. M. Gates, 12½ N. High St., Secretary, Columbus, O.

Engineers' Club of Minneapolis.—Meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month. H. E. Smith, Secretary, 1620 S. E. Fourth St., Minneapolis.

Engineers' Club of Philadelphia.—Meets at the house of the Club, 1122 Girard St., Philadelphia, Pa., on the first and third Saturdays of each month at 8 p. m., except during July and August. L. F. Rondinella, Secretary.

Engineers' Club of St. Louis.—Meets in the Missouri Historical Society Building, corner Sixteenth St. and Lucas Place, St. Louis, on the first and third Wednesdays in each month. Richard McCulloch, Secretary, 240 N. Spring Ave., St. Louis.

Engineering Association of the South.—Meets in the Berry Block, Nashville, Tenn., on the second Thursday of each month. H. M. Jones, Secretary, 1000 Broad St., Nashville.

Engineers' Society of Western New York.—Holds regular meetings on the first Monday in each month, except in the months of July and August, at the Buffalo Library Building. H. J. Marsh, Secretary.

Engineers' Society of Western Pennsylvania.—Meets at 410 Penn Ave., Pittsburgh, Pa., on the third Tuesday in each month, at 7.30 p. m. R. A. Fessenden, Secretary.

Franklin Institute.—Meets at 8 p. m. on the third Wednesday of each month, except July and August, at 15 S. Seventh St., Philadelphia, Pa. Wm. H. Wahl, Secretary.

Locomotive Foremen's Club.—Meets every second Tuesday in the club room of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn St., Chicago.

Louisiana Enginering Society.—Meets on the second Monday of each month at 8 p. m., at 712 Union St., New Orleans, La. J. F. Coleman, Secretary.

Montana Society of Civil Engineers.—Meets in Butte, Mont., on the third Saturday in each month at 7.30 p. m. A. S. Hovey, Secretary.

New England Railroad Club.—Meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month. Edward L. Janes, Secretary, P. O. Box 1158, Boston, Mass.

New York Railroad Club.—Meets at 12 W. 31st St., New York City, on the third Thursday in each month at 8 p. m., excepting June, July and August. W. W. Wheatley, Secretary, 168 Montague St., Brooklyn.

Northwest Railway Club.—Meets on the first Tuesday after the second Monday in each month at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul. T. A. Foque, Secretary, "Soo Line," Minneapolis, Minn.

Northwest Track & Bridge Association.—Meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

Railway Signaling Club.—Meets on the second Tuesday of January, March, May, September and November. C. O. Tilton, Secretary, C., M. & St. P. Ry., West Milwaukee, Wis.

St. Louis Railway Club.—Holds its regular meeting on the second Friday of each month at 3 p. m. H. H. Roberts, Secretary, 512 Commercial Bldg., St. Louis.

Southern and Southwestern Railway Club.—Meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November. S. A. Charpiot, Secretary, Savannah, Ga.

Technical Society of the Pacific Coast.—Meets at its rooms in the Academy of Sciences Building, 819 Market St., San Francisco, Cal., on the first Friday in each month, at 8 p. m. Otto Von Geldern, Secretary.

Texas Railway Club.—Meets on the third Mondays of February and August, at place and time chosen at the previous meeting. The next meeting will

be held in Austin, Tex., in February, 1900. T. H. Osborne, Secretary, Pine Bluff, Ark.

Western Foundrymen's Association.—Meets in the Great Northern Hotel, Chicago, Ill., on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is Secretary.

Western Railway Club.—Meets on the third Tuesday of each month except June, July and August, in the Auditorium Hotel, Chicago, Ill. J. W. Taylor, Secretary, 667 Rookery Bldg., Chicago.

Western Society of Engineers.—Meets in the Club rooms in the Monadnock Block, Chicago, Ill., on the first Wednesday of each month, except in January. Special meetings are held on the third Wednesday of each month. Nelson L. Litten, Secretary.

The Engineers' Club of Philadelphia.

A regular meeting of the club will be held on Saturday, December 16, 1899, at 8 o'clock p. m. The paper will be on "The Electrical Process of Annealing Armor Plates in the Construction of Warships." Illustrated by Chas. J. Dougherty.

New England Railroad Club.

At the meeting held at Pierce Hall, Boston, Dec. 12, the subject of the evening was "The Development of Transportation in the 19th Century," by Hon. G. G. Crocker, Chairman of the Boston Transit Commission. The paper was illustrated by the stereopticon.

Northwest Railway Club.

A meeting of the Northwest Railway Club was held Tuesday evening, December 12, at the West Hotel, Minneapolis, Minn. Prof. J. H. Gill of the University of Minnesota read a paper on "The Slide Rule and Its Uses," and a paper presented at the previous meeting by Mr. W. O. Johnson, "A Study of Cast Steel in the Tool Room and Machine Shop," was discussed.

Western Railway Club.

A meeting of the Western Railway Club will be held Tuesday afternoon, December 19, at the Auditorium Hotel, Chicago. Mr. Paul Synnestvedt, patent attorney, Chicago, will present a paper on "Patents"; and Mr. J. W. Luttrell, Master Mechanic of the Illinois Central, will discuss the advisability of doing away with the opening in the M. C. B. knuckle, now provided for coupling with link-and-pin couplers.

American Society of Civil Engineers.

We have already announced the fact that the next annual convention of the Society is to be held in London. The date has now been fixed as the first week in July. The Secretary requests members to inform him as promptly as possible as to their intentions to go or not in order that arrangements may be made. Obviously, the steamships and hotels will be crowded. Rates have been fixed for the round trip and one week in London and one in Paris, the lower rate for slow ships and the higher rate for faster vessels. These rates are $256 and $316, respectively, and include passage both ways, trains to London, hotel in London one week, fare to Paris, hotel in Paris one week, 6 admissions to Exposition, fare Paris to Cherbourg, and revenue tax.

American Economic Association.

The twelfth annual meeting of the American Economic Association will be held at Cornell University, Ithaca, N. Y., Dec. 27, 28 and 29. The annual address of the President of the Association, Arthur T. Hadley, President of Yale University, will be on "Economic Theory and Political Morality." This will be followed by a discussion by Profs. J. R. Commons, L. M. Keasbey, E. R. A. Seligman, and others.

Papers will be read on "Monopolies," by Prof. Richard T. Ely, and "The Place of the Speculator in Distribution," by Prof. H. C. Emery.

The subject on Thursday will be "Combinations of Trusts," with papers by Charles S. Fairchild, Prof. Sidney Sherwood and James Brooks Dill.

At the Thursday afternoon session there will be the following papers: "Railroad Relief and Beneficiary Associations," W. H. Baldwin, Jr., President of the Long Island Railroad; "Railway Charters," Dr. B. H. Meyer, University of Wisconsin; "Difficulties in Adjusting Rates," Martin A. Knapp, Chairman of the Interstate Commerce Commission.

Engineers' Club of Cincinnati.

At the regular meeting, held on November 16, Mr. Alfred Petry read a paper on "The Evansville Caisson." This caisson was built in 1896 and forms the bottom of the pump pit for the pumping station of the water works at Evansville, Ind. It is built of white oak and is circular in plan, with an outside batter, being a frustrum of a cone, 16 ft. high, and with its top and bottom diameters 77 ft. 6 in. and 80 ft. 2 in. respectively. The roof is 8 ft. thick, leaving a height of 8 ft. for the working chamber. The paper treated of the plan of construction of the caisson and the manner of sinking it to place, which was, for a part of the distance, by the use of compressed air, the apparatus for which was described in detail. The caisson supports a stone masonry well, circular in shape, 53 ft. inside diameter and 61 ft. deep, the wall of which is 12 ft. 3 in. thick at the bottom, tapering to 4 ft. at a height of 17 ft. from the top, and above that point continues the same thickness to the top. In this well are located the three pumping engines. The paper was illustrated by a large sketch of the caisson and a number of photographic views at different stages of construction.

Roadmasters' Association of America.

Below is the list of subject of committee reports and of papers for the 18th convention of the Roadmasters' Association of America. In each case we give the name of only the chairman of the committee or of the author of the paper.

Use of Tie Plugs in Hard and Soft Wood Ties.—Should spikes be re-driven in the same holes after inserting plug or should spike be driven in a new place? Should tie plugs be made of the same kind of timber as the tie? Chairman, T. Hickey, M. C. R. R., St. Thomas, Ont.

Cause of Excessive Flange Wear of Outside Rail on Curves.—What can be done to reduce the same? W. H. Brenton, Colorado Midland R. R., Colorado Springs, Colo.

Should Split-Switch Points Be Reinforced? How many rods should the points have? Should the points be higher than the stock rails? Should the points be adjustable? Methods of adjustment. Chairman, H. W. Church, L. S. & M. S. R. R., Englewood, Ill.

Reversing Alternate Bolts in Joints.—G. W. Merrell, N. & W. R. R., Roanoke, Va.

Best Method of Tamping Ties in Various Kinds of Ballast, Embracing the Following Heads: First:—Tamping all ties, including joint ties, with a shovel. Second:—Tamping all ties, except joint ties, with a shovel; the joint ties to be pick tamped. Third:—Tamping all ties with a pick. Fourth:—Tamping all ties with a bar. Chairman, R. P. Collins, R. M., N. Y., N. H. & H. R. R., Readville, Mass.

Improvements in Permanent Way to Reduce Renewals and Interruptions to Traffic, W. J. Prindle, Pennsylvania Company, Chicago, Ill.

Best Methods of Handling the Different Kinds of Ballast: Including loading, unloading, raising track and finishing. Chairman, W. E. Emery, C. & N. W. R. R., West Chicago, Ill.

Chemical Preservation of Cross Ties, J. M. Meade, A., T. & S. F. R. R., Topeka, Kas.

Improved Track Tools, Chairman, J. A. Prentice, L. S. & M. S. R. R., Toledo, Ohio.

Committee to Arrange for Eighteenth Annual Convention, Chairman, J. C. Rockhold, A., T. & S. F. R. R., Daggett, Cal.

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. C. C. McChord has been elected a member of the Kentucky Railroad Commission, succeeding Mr. H. S. Irwin.

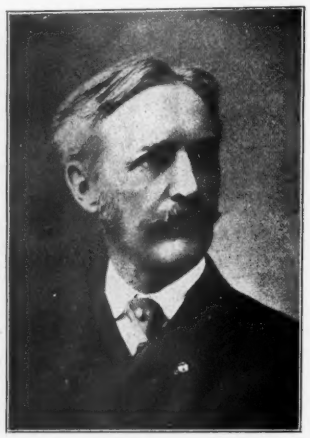
—The Governor of Arkansas has appointed Mr. Felix M. Hanley, of Melbourne, Railroad Commissioner in place of Gen. Robert Neill, resigned. Gen. Neill has been Chairman of the Board since its organization. Judge Hanley is a prominent lawyer in the northern part of the State.

—Mr. William A. Gardner, recently appointed General Manager of the Chicago & Northwestern Railway, entered the service of that company 20 years ago as stenographer and clerk to the General Superintendent. His rise to his latest appointment has been through the positions of Train Dispatcher, Trainmaster, Assistant Division Superintendent, Division Superintendent and Assistant General Superintendent.

—Lieutenant A. C. Ledyard, who was recently killed in an uprising in Negros, was a son of Mr. H. B. Ledyard, President of the Michigan Central RR. Lieutenant Ledyard was born in 1875 in Illinois and entered Yale University in 1898. In July last Lieutenant Ledyard accepted a commission as second lieutenant in the army, having served during the war with Spain in the Yale Battery, which never went to the front. His father, Mr. H. B. Ledyard, is a graduate of West Point and served in the artillery before he resigned.

—Mr. W. F. Merrill, Second Vice-President of the Erie Railroad, has been elected Vice-President of the New York, New Haven & Hartford, to take effect Jan. 1. Mr. Merrill now has charge of operation on the Erie, performing, in fact, the duties of General Manager, and such duties he will have on the New York, New Haven & Hartford, so far as we can learn; that is, he will have charge of the property and of its operation, including the fleet. Naturally, those who have a close interest in the Erie regret the change.

Mr. Merrill was born at Montague, Mass., July 14, 1842. He entered Amherst College and in his junior year, in 1862, enlisted in the volunteer service as an engineer soldier and served until the close of the war. He received a commission and is now a member of the Loyal Legion. After the war he went to the Lawrence Scientific School of Harvard University for special engineering study and in 1866 entered the civil engineering department of the Chicago, Burlington & Quincy, with which road and the Burlington & Missouri River he served until 1873, when he became Resident Engineer on the Erie. He then served as engineer and as superintendent on various railroads, including the Toledo, Peoria & Western, the Wabash, the Chicago & Alton, the Chicago, Burlington & Quincy, until August, 1890, when he became General Manager of the Chicago, Burlington & Quincy system, where he remained until Jan. 1, 1896. At that date he entered the service of the Erie as Second Vice-President in charge of operation.



It seems almost superfluous to say anything more about a railroad officer so well known in the East and in the West. Mr. Merrill's experience on the Western lines was varied and arduous. He was in the thick of the struggle during the years of greatest development of the Mississippi Valley roads, and had his share of competitive struggles, of strikes and of panics. Naturally, he has had no bed of roses on the Erie in the last three years, notwithstanding the fact that the Erie is now so excellently organized and officered. The road is almost necessarily undermanned, and Mr. Merrill's position has been a hard one. We do not imagine, however, that this has much to do with the change which he is now making, for he is a man of great energy and activity and apparently enjoys hard work. Indeed, if we had any criticism to make of his methods, it would be that he works too much, which, however, is a fairly good fault.

We notice in a dispatch from New Haven a statement that "a New York director says that Mr. Merrill represents none of the interests heretofore conflicting in the New Haven directory." This, we judge, is strictly true. In fact, we should say that he represents no interests other than those of good railroading.

—Mr. Richard Boyse Osborne died on Tuesday, November 28th, 1899, at Glenside, Pa., in his 85th year. He was born November 3, 1815, in London, England. He was one of seven children, three daughters and four sons, and the oldest of the latter—one of whom was the late John H. Osborne, also a civil engineer, and associated with him on many works. He was directly descended on his father's side from Sir Thomas Osborne of Kent, England, first Duke of Leeds, the Lord Danby whom readers of Macaulay will recognize. On his mother's side he descended from General Hugh Mercer, one of Washington's generals, of whom he spoke as "the worthy and brave Mercer." In July, 1834, Mr. Osborne went to Canada and went to the Philadelphia & Reading Railroad in 1838 as draughtsman, joining his former schoolmate, the late Gustavus A. Nicolls, of Reading, who served that company 52 years, and had then been three years on the road. He rose to the position of Chief Engineer, and in March, 1845, after over seven years' service, he went to Ireland and sent back his resignation, becoming Engineer in Chief of the Waterford & Limerick Railway, and serving that corporation until 1850. He patented there the Howe truss by arrangement with the inventor, and designed and built the first Howe truss roof ever put up in Great Britain. He planned the first large Howe truss roof ever erected in America, the old Philadelphia, Wilmington & Baltimore Station, now standing at Broad street and Washington avenue, Philadelphia. He designed and built the first Howe truss bridges in Great Britain, and perhaps the first iron Howe truss bridge ever constructed anywhere, which is now standing on the old main line of the Philadelphia & Reading, just above Manayunk, Philadelphia.

In 1852 he took charge of the surveys and construction of the Camden & Atlantic Railroad and the laying out of Atlantic City. In 1852 he also took charge of the Dauphin & Susquehanna Railroad, and in 1854 of the Lebanon Valley Railroad. From 1859 to 1870 he was professionally connected with the East Mahanoy, Danville & Northumberland, Shamokin & Northern, Jersey Shore, Pine Creek & State Line, Elmira & Williamsport, and New York & Oswego Midland Railroads.

In 1870 and 1871 he was Chief Engineer of the Western Maryland Railroad in the construction over the mountains. He wrote many voluminous reports on special work and published books or brochures on various engineering subjects, among which are Select Plans for Engineering Structures, Treatise on the Merits of Narrow Gauge Railroads, Professional Biography of Moncure Robinson, etc.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—H. U. Mudge, heretofore General Superintendent, has been appointed General Manager, with headquarters at Topeka, Kan., succeeding J. J. Frey, resigned. Effective Jan. 1.

Baltimore, Chesapeake & Atlantic.—The office of General Freight Agent, held by J. S. Wilson, Jr., has been abolished.

Canadian Pacific.—James Kent has been appointed Manager of Telegraph, succeeding C. R. Hosmer, resigned. A. W. Barber has been appointed Superintendent of the Ontario Division, with headquarters at Toronto. W. J. Camp has been appointed Superintendent of the Eastern Division, with headquarters at Montreal. C. S. Jenkins has been appointed General Superintendent of the lines west of Fort William, with headquarters at Winnipeg.

Central Vermont.—C. E. Soule, heretofore Assistant Superintendent, has been appointed Superintendent at St. Albans, Vt., succeeding F. W. Baldwin, resigned. W. T. Sutphen has been appointed Assistant Superintendent of the Southern Division, with headquarters at New London, Conn., succeeding Mr. Soule.

C. E. Fuller, Superintendent of Motive Power, with headquarters at St. Albans, Vt., has resigned. Effective Jan. 1.

Chatham & Lebanon Valley (Successor to the Lebanon Springs).—John Delahunty is Vice-President and A. R. McGonegal, General Freight and Passenger Agent.

Chicago & Alton.—W. H. Gridley, heretofore Superintendent of the St. Louis, Peoria & Northern, has been appointed Assistant Superintendent of the C. & A., with headquarters at Bloomington, Ill. G. S. Tyler, Assistant General Freight Agent at St. Louis, Mo., has resigned.

Chicago & Northwestern.—The position of Assistant General Superintendent has been abolished. At a meeting of the stockholders held Dec. 8, Marshall Field was elected a Director, succeeding J. I. Blair, deceased.

Chicago, Indiana & Eastern.—Paul Brown is President and Eugene Stewart Vice-President.

Chicago, Paducah & Southern.—The officers of this company, referred to in the Construction column, are: President, A. K. Vickers, Vienna, Ill.; Treasurer, A. W. Underwood, Chicago; Secretary and General Manager, F. P. Reid, Marion, Ill.

Choctaw, Oklahoma & Gulf.—The headquarters of H. E. Yarnall, Local Treasurer and Purchasing Agent, and S. J. Haydon, Auditor, have been removed from South McAlester, I. T., to Little Rock, Ark.

Cincinnati, New Orleans & Texas Pacific.—W. M. Maguire has been appointed Division Superintendent, with headquarters at Somerset, Ky., succeeding A. Griggs, resigned.

Colorado Springs & Cripple Creek District.—E. F. Draper has been elected Secretary and Auditor.

Columbia Southern.—The office of Vice-President, formerly held by D. C. O'Reilly, has been abolished.

Dansville & Mount Morris.—Howard L. Wood, heretofore Acting Auditor, has been appointed Auditor, with headquarters at New York. G. E. Dunklee has been appointed General Passenger Agent, relieving M. F. Lapp to this extent.

Denver & Rio Grande.—C. A. Parker has been appointed Superintendent of Telegraph, with headquarters at Denver, Col., succeeding S. B. Grimshaw, resigned.

Erie.—C. E. Fuller, heretofore Superintendent of Motive Power of the Central Vermont, has been appointed Assistant Master Mechanic at Susquehanna. Effective Jan. 1.

Findlay, Ft. Wayne & Western.—At a meeting of the stockholders J. J. Astor was elected Chairman of the Board and George Chapman was elected President, succeeding Mr. Astor.

Florence & Cripple Creek.—C. F. Elliott, Traffic Manager at Denver, Colo., has resigned.

Fort Worth & Denver City.—M. H. Mills has been appointed Assistant Superintendent, succeeding C. M. Hunt, resigned.

Gulf & Brazos Valley.—O. J. Watrous has been appointed General Traffic Manager and Freight and Passenger Agent, with headquarters at Mineral Wells, Tex.

Houston, East & West Texas.—At a meeting of the stockholders W. W. Miller of New York was elected a Director.

Intercolonial.—J. B. Lambkin and H. A. Price have been appointed Assistant General Passenger Agents.

Interstate Car Transfer Co.—W. C. Norris has been appointed Superintendent, having in charge all matters in connection with transportation and equipment.

Jamestown & Chautauqua.—J. T. Adams has been elected Secretary, succeeding McK. D. McKee.

Kansas Southwestern.—John S. Hendrie has been elected Secretary, succeeding P. M. Bankier, deceased.

Louisville, Henderson & St. Louis.—Lucien J. Irwin, formerly with the Cumberland Gap Dispatch, has been appointed General Freight and Passenger Agent. Effective Dec. 7. The position of Traffic Manager, held by Edgar Hill, deceased, has been abolished.

Mexican Mineral.—The officers of this company, recently incorporated in New York, are: President, George D. Cook; Vice-President and General Manager, D. C. Brown; Secretary and Treasurer, C. J. Nourse, Jr., and Superintendent, J. A. Hudson. (See RR. Construction column, Aug. 18, p. 590.)

Mississippi River & Bonne Terre.—Dwight A. Jones has been elected Second Vice-President.

Montana.—Robert Rantoul has been appointed General Manager, with headquarters at Helena, Mont.

Mount Jewett, Kinzua & Riterville.—The title of T. E. Moulton has been changed from Trainmaster to Superintendent.

New York, New Haven & Hartford.—W. F. Merrill, Second Vice-President of the Erie has been elected Vice-President of the N. Y., N. H. & H. Effective January 1. Mr. Merrill succeeds William D. Bishop of Bridgeport, who took the position temporarily a few weeks ago.

Ohio Central.—H. C. Ferris, Division Superintendent at Columbus, O., will assume the duties of Engineer Maintenance of Way.

Ohio River & Lake Erie.—C. H. Miller, Car Accountant, will also assume the duties of Auditor, succeeding F. L. Chevee, resigned.

Pennsylvania.—John M. Wilson has been appointed Assistant Supervisor, with headquarters at Osceola, Pa., succeeding N. M. Hench.

Pittsburgh & Lake Erie.—D. J. Redding has been appointed Master Mechanic, with headquarters at McKee's Rocks, Pa.

Plant System.—At a meeting of the stockholders of the Brunswick & Western, Lynde Harrison was elected President and S. R. Knott, Vice-President. At the same meeting Mr. Knott was elected a Director. R. G. Erwin has been elected President and S. R. Knott, Vice-President of the Savannah, Florida & Western.

St. Clair, Madison & St. Louis.—The headquarters of John F. Barnard, Receiver, have been removed from St. Louis, Mo., to Alton, Ill.

St. Louis, Kennett & Southern.—P. Maul is Acting Auditor and E. F. Blomeyer General Freight and Passenger agent of this company, with headquarters at Cape Girardeau, Mo.

Sedalia, Warsaw & Southwestern.—E. H. Calef has been appointed General Freight Agent, with headquarters at Sedalia, Mo., succeeding E. B. Lane, resigned.

Sioux City & Western.—D. Miller, President of the S. C. & W., informs us that the position of General Manager, held by F. C. Hills, deceased, will not be filled.

Southern Pacific.—L. J. Parks has been appointed General Passenger and Ticket Agent of the entire Atlantic System, his jurisdiction extending from New Orleans to El Paso, Tex., with headquarters at Houston, Tex., succeeding Mr. Morse. Effective Dec. 1.

Spokane Falls & Northern.—F. W. Bobbett, Secretary and Treasurer, has been elected Vice-President, succeeding C. Shields, resigned, effective Dec. 1. F. S. Forest, heretofore Assistant Superintendent, has been appointed Superintendent in charge of operation and maintenance of the property.

Syracuse, Binghamton & New York (Delaware, Lackawanna & Western).—At a meeting of the stockholders held Dec. 5, the following Directors were elected: W. H. Truesdale, F. F. Chambers, E. G. Russell and B. D. Caldwell.

White Pass & Yukon.—After March 1 the general offices of this company will be removed to Skagway, Alaska.

RAILROAD CONSTRUCTION.
New Incorporations, Surveys, Etc.

ATKINSON & NORTHERN.—Grading is completed on 22 miles of this line from Atkinson, Neb., north 25 miles, via Thorn and Angora, to Perry, on the north side of Niobra River. No track is laid. B. E. Sturdevant of Atkinson is President and A. O. Perry General Manager. (April 21, p. 288.)

ARKANSAS SOUTHERN.—Track is laid on this line from Junction City, Ark., south to Ruston, La., and trains are now running. C. C. Henderson of Junction City, Ark., is General Manager. (June 30, p. 482.)

ALABAMA ROADS.—An officer of the Central of Georgia writes that the C. of G. has had correspondence with people at Ashland with reference to a road between Hollins, on the company's line, and that city. As yet no conclusions have been reached and it is not known whether anything definite will materialize.

ATLANTA, KNOXVILLE & NORTHERN.—A number of improvements are being made, according to report, on the line from Knoxville, Tenn., south 103 miles to Ducktown.

ALASKA & NORTHWESTERN.—Application is to be made to the Canadian Parliament for incorporation of this line, to run from Pyramid Harbor, Alaska, north through Chilkoot Pass and along the Dalton Trail to Ft. Selkirk, N. W. T. The company was incorporated in West Virginia a year ago to build the American end. N. Pierre Humbert, Jr., of Boston, Mass., is interested. (April 28, p. 305.)

BELINGTON & BEAVER CREEK.—Contracts are to be made at once for six miles of this line from Belington, W. Va., to Beaver Creek. The Roaring Creek & Charleston is interested. (Nov. 17, p. 800.)

BRITISH COLUMBIA ROADS.—Langley & Martin of Victoria are making application for a charter to build a line from Atlin to Discovery, in the District of Cassiar.

Wilson & Senkler are making application for a company to build a line from the head of Kitimat Arm via the mouth of Copper River, Kitscilas Canyon and Skeena River, to Hazleton, and thence to Pine Creek Pass, with an extension to Quesnelle and Yellow Head Pass.

H. Maurice Hills of Victoria, B. C., has made application to the Canadian Parliament to build a line from the Comox District, Vancouver Island, north through the Sayward and Rupert districts to Cape Scott at the north end of the island.

BRITISH COLUBIA SOUTHERN.—G. Campbell Oswald of Montreal, Que., gives notice of application to the Dominion Parliament for an extension of time for completing the road to the end of 1904. (Dec. 23, 1898, p. 923.)

BUFFALO & SUSQUEHANNA.—A contract is let, according to report, for an extension from Cross Fork, Pa., south to the coal lands of Mann & Kintzing.

Surveys are reported in progress for a cut-off between Wharton, Pa., and Sinnemahoning to do away with steep grades and sharp curves.

CALIFORNIA ROADS.—The Loyalton Lumber Co. of Loyalton is reported building a narrow-gage logging road from its mill south toward Beaver Valley.

CANADIAN PACIFIC.—Bids are asked for an extension from Nelson, B. C., northeast about 25 miles to a point opposite Balfour. (Nov. 17, p. 800.)

Application will be made to the Dominion Parliament to authorize the company to build a railroad from Morden, Man., north about 35 miles via Miami to Carman; also to build a railroad from a point between Hartney and Souris, Man., southeast to a point on the Manitoba & Southwestern between Boisevain and Ninga.

CENTRAL OF WEST VIRGINIA.—Grading is completed for 10 miles on this line, from Morgantown, W. Va., via Reedsville, Gladesville, Independence and Meadowville, to Belington. Geo. C. Sturgiss of Morgantown is President. (Sept. 15, p. 649.)

CHATHAM & LEBANON VALLEY.—A 12-mile strip between Chatham, N. Y., and Brainerd has been opened on this line, successor to the Lebanon Springs. The company is rebuilding the entire line. (Oct. 27, p. 753.)

CHICAGO, PADUCAH & SOUTHEASTERN.—The Council of Metropolis, Ill., has passed an ordinance granting right of way to this company through that city on condition that the road be built and operated within 18 months. The road is projected from Vienna southeast 30 miles to Metropolis, and right of way is being secured between those points. At a meeting of the stockholders held at Vienna Dec. 6, the company was fully organized. The officers are given under Elections and Appointments. (Nov. 17, p. 800.)

CHOCTAW, OKLAHOMA & GULF.—Extensive improvements are in progress on the old Little Rock & Memphis line. The new bridges over the White and St. Francis rivers are practically completed. The company intends to practically reconstruct the line in the swampy country in eastern Arkansas.

CLEVELAND, OHIO CENTRAL & CINCINNATI.—The road referred to last week under Ohio Roads (p. 853) was incorporated Dec. 4 under the above title, with a capital stock of $10,000, to build a railroad from Cleveland south via West Salem to Cincinnati. The incorporators are: F. G. McCauley, Allen Greely, G. A. Carlin, E. W. McFadden, J. T. Britton, W. E. Saler, W. S. Zelner, E. J. Myers, J. C. Clark, B. Myers, F. L. Berry, N. W. Zimmerman, F. W. Sallsman and D. W. Garver. The headquarters are at West Salem, O.

COAL & IRON.—Contracts will be let in the spring for this company's line from a point on the West Virginia Central & Pittsburgh in West Virginia, to run south about 43 miles to the forks of Greenbrier River. Sealed proposals will be received up to Dec. 30 for two tunnels on the line, one four miles south of Elkins through the Valley Mountain, about 16 ft., and the other 14 miles from Beverly through Shaver's Mountain, about 1,000 ft. The work is to be begun on or before Feb. 1. C. H. Latrobe, Room 813, Merchant's Bank Bldg., Baltimore, Md., is Consulting Engineer.

DELAWARE, LACKAWANNA & WESTERN.—With reference to double tracks of the Keyser Valley Branch, an officer writes that the company is connecting up side tracks which will give a mile or so of double track. This does not require any additional grading. (Dec. 8, p. 853.)

DEST MOINES, IOWA FALLS & NORTHERN.—Surveys are reported in progress between Iowa Falls and Des Moines for this newly incorporated company's line from Des Moines, Ia., north about 120 miles to Osage. L. N. Cummings of the Chicago Loan & Trust Co. is organizer. (Dec. 8, p. 853.)

DULUTH, ST. CLOUD & SOUTHWESTERN.—This company is being organized to build a railroad from Duluth, Minn., southwest about 200 miles, touching the south shore of Mille Lacs Lake, to St. Cloud, and thence south about 175 miles via Glencoe and Arlington, to Mankato. It has been decided to assume the old organization of the Duluth, Glencoe & Southwestern, incorporated about 13 years ago. A. H. Reed is President and E. A. Childs Treasurer, both of Glencoe, Minn.

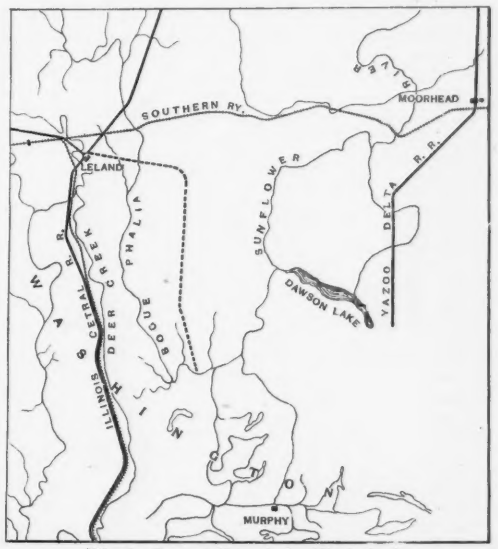
EL PASO & NORTHEASTERN.—The company is building an extension of eight miles to the Alamogordo & Sacramento Mountain line from Toboggan, N. M., to Cox Canyon. This will pass through Cloudcroft, quite a noted summer resort on the summit of the Sacramentos. The line will have 30° curves and 4 per cent. grades until it reaches the summit, and then runs along the summit to the south. Grading is practically completed and the bridging about half done. Track laying will be begun near the end of December. Geo. S. Good & Co. of Lock Haven, Pa., the contractors, have between 300 and 400 men at work. The work is mostly solid rock and very heavy in places. There will be several wooden trestles, two of them 80 ft. high and from 250 to 300 ft. long, one of them having a 30° reverse curve. (Nov. 17, p. 800.)

The extension of the main line from Alamogordo Junction, N. M., north 77 miles via Tularosa, Temporal, Three Rivers, Malagra, Jakes, Carrizosa, Walnut and Indian Divide to Capitan, was finished on Oct. 13. (Oct. 13, p. 719.) Geo. S. Good & Co. have the contract. (Official.)

GUYANDOT VALLEY.—Hoover, Stearns & Co. of Columbus, O., have the contract for 30 miles of this line from Huntington, W. Va., southeast up the Guyandot River. Grading is to be begun soon. (Nov. 24, p. 819.) J. L. Caldwell of Huntington, W. Va., is President.

GULF & BRAZOS RIVER.—Application is made by this company to the Texas State Railroad Commission for authority to issue bonds to the extent of $14,000 per mile on the 11 miles now completed from the Texas & Pacific to Mineral Wells. F. A. Glass of Hearne, Tex., is President and General Manager. (Nov. 10, p. 787.)

ILLINOIS CENTRAL.—About 70 per cent. of the grading is completed, but no track laid on the Yazoo & Mississippi Valley extension from Leland, Miss., southeast 18 miles across the Bogue Phalia River. Pond & Cooper of Moorehead, Miss., have the contract. The accompanying map indicates by a broken line this proposed extension from the main line at



Illinois Central Branch in Mississippi.

Leland southeast toward Murphy, a point about 30 miles distant. The Yazoo Delta RR. shown in the upper right corner is the newly completed extension of the Illinois Central to Lake Dawson. The Southern parallels the main line of the I. C. for a few miles south of Leland, as indicated on the map. (Aug. 18, p. 589.)

On the Albert Lea & Southern extension from Lyle, Minn., northwest 25 miles via Glenville to Albert Lea, on the Minneapolis & St. Paul, J. D. Lynch of Monmouth, Ill., and Donald Sinclair of Kankakee, Ill., have the contracts. (April 21, p. 209.)

J. C. Neely has the contract for the cut-off on the Wallahatchie branch of the Yazoo & Mississippi Valley between Black Bayou and Philip, Minn., 3½ miles. (Official.)

The company is reported making preparations for building a railroad from its Fort Dodge & Omaha extension, nearly completed, to Omaha, to run north about 90 miles to Sioux City, Ia. It is stated that the engineers have been making an investigation as to the feasibility of the route, and that if their report is satisfactory, surveys will be made during the winter and right of way secured before spring.

KANSAS & SOUTHERN.—This company has been incorporated in Oklahoma Territory, with a capital stock of $1,000,000, to build a railroad from a point on the north line of the Territory, at the intersection of the Arkansas River, to run southeast 140 miles through Dawson, I. T., on the St. Louis & San Francisco, to a point on the Missouri, Kansas & Texas in the Creek Nation. The Directors are: E. H. Brown, Girard, Kan.; C. H. Kimball, Parsons, Kan.; W. H. Parker and J. W. Howard, Tulso, I. T.; J. M. Brooks, Guthrie. There is probably no connection between this line and a road in Kansas of the same name just completed by the Southern Construction Co., from Westmoreland to Blaine. (Nov. 24, p. 819.)

KLIPKNOCKIE.—This company was incorporated in New York Dec. 6, with a capital stock of $100,000, to build a line from Birdsall on the Central New York & Western line of the Pittsburgh, Shawmut & Northern, to run east about seven miles to Almond on the Erie. The Directors are: Frederick H. Mollenhauser, 45 Wall St., New York; George S. Bixby and Simeon M. Ayres of New York.

LOUISVILLE & NASHVILLE.—About 35 miles of the Southern Alabama from Pineapple, Ala., south 40 miles to Repton, is reported completed, and the additional five miles is to be finished by Jan. 1. (Sept. 15, p. 650.)

MASONTOWN & NEW SALEM.—F. H. Clement & Co. of Philadelphia are reported to have the contract for building this line from Masontown north eight miles to New Salem. There are about 60 men at work. John P. Brennan of Scottdale, Pa., is President. (Sept. 15, p. 650.)

MEXICAN ROADS.—Emilio Pardo, of Pueblo, Mex., has obtained a concession from the Government for a railroad in Puebla from Misa de la Nicaxa to San Antonio Atlehuitza. Surveys are to be completed within six months and the first 10 km. (6.2 miles) completed within 18 months. The entire line is to be completed within five years at the rate of not less than 15 km. (9.3 miles) per year.

Preliminary surveys are reported completed for a line from Quiotepec on the Mexican Southern, to run northeast through the State of Oaxaca via Valle, National and Tuxtepec, to Motzorongo along the Papaloapan River.

MEXICAN SOUTHERN.—Sr. Luis Garcia Teruel of Mexico City is building a branch from the Oaxaca Station, Mex., to run south toward Ejutla.

The Tlacotepec & Huajuapan de Leon extension, which was completed from Tlacotepec, Mex., east 30 km. (18.6 miles) to Las Pilas, Puebla, is being extended slowly from Las Pilas in the direction of Acatlan. (Nov. 25, 1898, p. 852.)

MILWAUKEE & SOUTHWESTERN.—The Milwaukee County Board has voted to submit to the people the question whether Milwaukee County shall give its bonds for $800,000 stock of this company, which proposes to build a line from that city southwest about 200 miles. The company must put up bonds for $300,000 to fulfil its contracts. John W. Wagner of Milwaukee is Attorney for the road.

MINNESOTA ROADS.—The Itasca Lumber Co., which has built 20 miles of logging line from Deer River, Minn., north, proposes to extend its line from 12 to 20 miles more toward Koochiching, on the Canadian border line.

MONONGAHELA SOUTHERN.—Contracts are let, according to report, for this line from Thomson Station, Pa., opposite Port Perry, to run southwest 30 miles to Finleyville, on the Baltimore & Ohio, and thence to the mouth of the Cheat River. It will form a feeder of the Pittsburgh, Bessemer & Lake Erie. (Nov. 17, p. 801.)

NEBRASKA & GULF.—This company has been incorporated in Nebraska, with a capital stock of $1,000,000, to build a line from Niobrara, Knox County, to run south to a point on the boundary line between Kansas and Texas.

NEW YORK, NEW HAVEN & HARTFORD.—O'Brien & Sheehan of New York, the contractors, have begun work on the improvements at Bridgeport, Conn. (Nov. 17, p. 801.

NORTH ARKANSAS & WESTERN.—A charter has been approved in Arkansas for this company, with a capital stock of $1,300,000, to build a railroad from Fayetteville, on the St. Louis & San Francisco, to run west about 30 miles to the Kansas City, Pittsburgh & Gulf. This road, as alread noted, is being built by the Arkansas Construction Co. of Little Rock, Ark. The incorporators are: F. P. Hall, J. J. Baggette, E. S. McCormick and S. E. Rogers, Prairie Grove; John R. Harris, W. L. Stuckey, George T. Lake, C. C. Connor, Fayetteville; John M. Pittman, Prescott; W. A. Bright, Little Rock. (Dec. 1, p. 835.)

OHIO & KENTUCKY.—Grading is begun, according to report, on this line from Jackson, Ky., terminal of the Lexington & Eastern, to run northeast 26 miles through timber and mineral lands into Morgan County. R. M. Broas of Lexington is Chief Engineer. M. Lally of Detroit, Mich., has the contract. (Oct. 20, p. 737.)

OHIO, TENNESSEE & CAROLINA.—This company was incorporated in Tenessee Dec. 6, with a capital stock of $10,000, to build a railroad from Jellico on the Kentucky-Tennessee line, to run south via Knoxville to the North Carolina line in Blount County. The incorporators are: Wm. Kirby, Toledo, O.; W. M. Crawford, Columbus, O., and W. B. Crenshaw, R. W. Austin, A. Aebli and J. C. J. Williams, Knoxville, Tenn.

OMAHA & ST. LOUIS.—The company is spending large sums in improvements, including stone ballasting the track from Quincy to Council Bluffs, and the relaying of the line between Pattonsburg and Council Bluffs with 75-lb. rails.

OREGON RAILROAD & NAVIGATION.—The extension from Elgin, Ore., east 63.3 miles to Joseph is fully located, but nothing done yet on construction. (June 30, p. 483.)

The company has completed the branch from Fairfield, Wash., southwest five miles to Waverly. (April 28, p. 305.)

It has also completed a betterment of the existing line near Huron, Ore., on the west slope of the Blue Mountains, between bridges No. 116 and No. 123, about one mile. This work consisted of tunnelling along Meadow Creek in order to eliminate six 150 ft. truss spans.

Grading and bridging are completed on the extension from Dayton, Wash., northeast 13 miles to Turner's. No track is laid as yet. (Feb. 10, p. 108.)

The Clearwater Valley extension from Lewiston, Id., southeast 101 miles via Camas Prairieto Mount Idaho is fully located, but there is no building as yet.

On the Snake River Valley extension from Riparia, Wash., 70½ miles, to Lewiston, Id., contracts were let to Hale & Smith (40½ miles), and to the Oregon Land & Construction Co. (30 miles), but the contracts have been annulled and all construction operations have ceased. Only about one-twentieth of the grading was completed. (Sept. 8, p. 633.)

The Snake River Valley extension (Nov. 17, p. 801) from Wallula, Wash., northeast 65.7 miles to Riparia, was fully completed and operation begun Dec. 1. (Official.)

ROCKINGHAM & WEST VIRGINIA.—Surveys are completed from Harrisonburg, Va., to the summit of the Shenandoah Mts., 23 miles, and the company expects to begin grading soon on this line from Gordonsville, Va., on the Chesapeake & Ohio, to run west 75 miles, via Elkton and Harrisonburg, Va., to Franklin, W. Va. James S. Negley, 141 Broadway, New York, is President, and A. A. Chapman of Harrisonburg, Chief Engineer. (Dec. 8, p. 853.)

SACRAMENTO & SAN JOAQUIN VALLEY.—Surveys are completed on the main line from Stockton, Cal., north 45 miles via New Hope and Franklin to Sacramento. About two-thirds of the right of way is secured. A branch is proposed from Franklin to Courtland. Contracts are to be let about March next. The line passes through a level country with no cuts and practically no curves. The maximum curves are 4 per cent. There will be one drawbridge 180 ft. long; one steel bridge without draw, 100 ft. (Dec. 1, p. 836.) John Cross of Los Angeles, Cal., is President and Chief Engineer. (Official.)

ST. LOUIS & NORTHERN ARKANSAS.—Surveys are completed for the extension of this line, formerly the Eureka Springs, from Eureka Springs, Ark., east about 40 miles to Harrison. The latter city has granted a bonus of $25,000. (June 9, p. 418.) Eureka Springs. (Sept. 8, p. 633.)

SALEM & SOUTHERN.—This company was incorporated in Missouri Dec. 4, with a capital stock of $1,000,000, to build a railroad from Salem on the St. Louis & San Francisco, to run southwest about 100 miles to the State line in Ozark County. The incorporators are: H. H. Artz, Mountain Home, Ark.; B. B. Canterbury, H. G. Doty, S. H. Henry, R. J. Greathouse and Richard Ramsey, West Plains, Mo.; C. H. Dreyer, Peace Valley, Mo.

SAN ANTONIO & BROWNSVILLE.—Surveys are completed and arrangements made to let contracts at once for 35 miles of this line projected from San Antonio, Tex., south about 275 miles to Brownsville. H. M. Aubrey of San Antonio is President. (Nov. 3, p. 770.)

SANTA FE & GRAND CANYON.—Track laying is reported completed for 20 miles, and half a mile of track is being laid each day on this line from Williams, Ariz., on the Santa Fe Pacific, to run north 72 miles via Flagstaff to the Grand Canyon of the Colorado. The line is graded for about 40 miles. The company expects to have the line in operation to copper mines, 47 miles from Williams, by Jan. 1. (Oct. 27, p. 753.

TALLAHASSEE SOUTHEASTERN.—Work is to be resumed soon, according to report, on this line from Tallahassee, Fla., to run south 101 miles, via Perry, to the Suwanee River. It has been completed to the Wassissa River, 20 miles. R. L. Bennett of Tallahassee, Fla., is Vice-President and General Manager. (Feb. 10, p. 109.)

TENNESSEE & ALABAMA MINERAL.—Application was made for a charter to incorporate this company in Tennessee Dec. 4, to build a railroad from near Lawrenceburg, on the Louisville & Nashville, to run south about 30 miles to a point in Alabama near Tuscumbia on the Southern. The incorporators are: J. Craig McLanahan, Chos. G. Roberts, Wm. L. Granbery, C. C. Christopher and C. S. Roberts.

TENNESSEE ROADS.—Surveys are reported in progress for a line by the Cumberland Coal & Coke Co., to run from Piney Creek, 16 miles east of Crossville, on the new Tennessee Central to the company's coal fields on Crab Orchard Mountain. Building is to be begun as soon as surveys are completed.

VERA CRUZ & PACIFIC.—The J. P. McDonald Co., of New York, is reported to have the contract for the section of this line from kilometer 100 south to Santa Lucretia, Mex., 128 miles, formerly held by Joseph Qualey & Co., Cincinnati.

WASHINGTON ROADS.—The Central Navigation & Construction Co. of The Dalles, Ore., is reported building a portage road from Columbus east 20 miles along the north bank of the Oregon River to Crates Point, three miles above The Dalles, Ore. Winters & Chapman have the contract to complete the line by April 15, 1900. The company proposes also to connect the city of Spokane with a point on the Columbia River, and to run steamers down the river to the portage road and then from a point below to Astoria. The entire project comprises about 1,000 miles of river navigation and about 350 miles of railroad feeders. Surveys are reported completed on the line from Spokane to the Columbia River. The company has bought the steamboat Frederick K. Billings for the Upper Columbia traffic. W. J. Harris is President and Paul Mohr, Manager, both of The Dalles, Ore.

WICKLIFFE, PARIS, FLORENCE & BIRMINGHAM.—Dixon S. Carter of Champaign, Ill., is interested in a railroad under the above title to run from Wickliffe, Ky., south about 250 miles via Paris, Tenn., and Florence, Ala., to Birmingham, with a branch from Wickliffe east 25 miles to Paducah.

GENERAL RAILROAD NEWS.

ATCHISON, TOPEKA & SANTA FE.—The Denver & Santa Fe and the Pueblo & Arkansas Valley, owned by the Atchison, have been conveyed to that company whose mortgages are now a direct lien upon the property.

CHICAGO, BURLINGTON & QUINCY.—Sealed proposals will be received up to Dec. 15 for as many Burlington & Missouri River in Nebraska non-exempt 6 per cent. bonds, due July 1, 1918, as $140,-585 will buy.

CLEVELAND, LORAIN & WHEELING.—A press report states that Blair & Co., of New York, and others, have bought a controlling interest in this property. (Sept. 23, 1898, p. 698.)

COLUMBUS, LIMA & MILWAUKEE.—Judge Hubbard of Toledo, O., has appointed H. G. Baker receiver of this property on the petition of Horton & Co. (Dec. 1, p. 836.)

GRAND RAPIDS & INDIANA.—The $920,000 first mortgage 7 per cent. land grant bonds bought at maturity Oct. 1 by the Pennsylvania RR., have been extended at 3½ per cent. to July 1, 1941. (Sept. 29, p. 686.)

MEXICAN NATIONAL.—Following the decision of the English Court of Appeals reversing the judgment of the lower and authorizing the trustee to sell the $4,528,100 Mexican Government 5 per cent. internal silver bonds outstanding, an appeal may yet be taken which will restrain the sale of these bonds pending the decision. The proceeds, if sold, will be used toward paying off the 6 per cent. bonds. (Dec. 1, p. 836.)

MISSOURI, KANSAS & TEXAS.—The main question in the suit of Mary P. Steven and others, stockholders of the Kansas City & Pacific, is yet to be heard in the suit enjoining the M., K. & T. from absorbing the Kansas City & Pacific by consolidation. No consolidation can be effected until this suit is settled. (Dec. 8, p. 854.)

NEW YORK, NEW HAVEN & HARTFORD.—The company has petitioned the Railroad Commissioners of Massachusetts for approval for an additional issue of $245,000 in 4 per cent. debentures, and $230,800 in stock for the Norwich & Worcester extension built this year to Groton, Conn.

NORTHERN PACIFIC.—Judge Jenkins at Milwaukee, Dec. 7, discharged Frank G. Bigelow and E. W. McHenry as receivers of the old company.

PERE MARQUETTE.—The stockholders of the Flint & Pere Marquette, the Chicago & West Michigan and the Detroit, Grand Rapids & Western, last week ratified the sale of their properties to the new company. (Nov. 10, p. 788.)

RALEIGH & GASTON.—At a meeting of the stockholders at Raleigh, N. C., Dec. 9, initial steps were taken for the unification of the Seaboard Air Line system through the absorption of subordinate companies into the R. & G. The terms of the acquisition are to be arranged by the directors, who will report at an adjourned meeting to be held in Raleigh, Dec. 21. (Dec. 8, p. 854.)

SIOUX CITY & NORTHERN.—At the foreclosure sale at Sioux City, Ia., Dec. 12, the property was sold to Wm. Stewart Tod and Robert E. Tod of J. Kennedy Tod & Co., New York, for $1,500,000. The road went into the hands of receivers Oct. 5, 1893. (Nov. 3, p. 770.)

SOUTHERN PACIFIC.—Speyer & Co., New York, officially deny the statement that they have bought the S. P. shares of General Thomas H. Hubbard, as noted last week. (Dec. 8, p. 854.)

WEST VIRGINIA CENTRAL & PITTSBURGH.—At a meeting of the stockholders of this company and of the Davis Coal & Coke Co., on Dec. 11, it was decided to increase the capital stock of the railroad company to $10,000,000, and to take full control of the Davis Coal & Coke Co. (Dec. 8, p. 854.)

WISCONSIN CENTRAL.—According to an official circular, the company ceased the use of the freight and passenger terminals of the Chicago Terminal Transfer RR. at Chicago at 9 p. m., Dec. 10, and are entering Chicago on the tracks of the Illinois Central, using the Central Passenger Station. Under the new arrangement, the W. C. will run both its passenger and freight trains over the Chicago Junction road from Franklin Park to Broadview, and then over the Madison Division of the I. C. and the St. Charles Air Line. All freight will be handled in the I. C. freight house and teaming yard at the foot of South Water St., and the local freight offices will be in the South Water St. freight station. The Terminal Transfer Company, owner of the Grand Central Station, at Harrison St. and Fifth Ave., now has but two tenants in that station, the Baltimore & Ohio and the Chicago Great Western. There are four roads in the Park Row Station—the Illinois Central, the Big Four, the Michigan Central and the Wisconsin Central. (Nov. 17, p. 802.)

ZANESVILLE & OHIO RIVER.—T. J. McDermott has been appointed Special Master of this line, which is to be sold early in January next. The road runs from Zanesville, O., to West Marietta, 72.4 miles. It went into the hands of a receiver July 9, 1892. (Oct. 27, p. 754.)

TRAFFIC.

Traffic Notes.

A number of general passenger agents have held a conference at Washington on the subject of ticket brokerage legislation, and it is said that the General Passenger Agents' Association will again urge the passage of a bill prohibiting ticket scalping.

The Soo line has cut another $2 from its St. Paul-New York second class passenger rate, reducing the same to $15, or below the regular second class rate from Chicago to New York. The competition is being generally met by the roads through Chicago.

Live stock shippers at Kansas City are making loud complaints at the changes in the live stock tariffc in Kansas by which carloads are now charged at actual weight instead of at a lump sum per car. All of the roads in Kansas have adopted this change.

Press dispatches from San Francisco say that the Treasury Department has promulgated a rule requiring goods shipped from Europe to Asia through the United States to be appraised either at the Atlantic or the Pacific port. Complaint is made that such appraisal will cause annoying delays.

Texas papers report that General Manager Polk, of the Gulf, Colorado & Santa Fe, has been called before the State Railroad Commission on a charge of contempt. Colonel Polk wrote a caustic letter to the Commission on the subject of freight rates, and when requested to withdraw it refused to do so.

The Arkansas Railroad Commission has abrogated the special cotton tariff which was issued by the Board Oct. 2. Cotton will now be carried at the rates in the general tariffs, but the Commission issues a set of rules regulating its carriage over two or more roads and prescribing rates and conditions for compressing.

The Chicago, Milwaukee & St. Paul will discontinue the use of the envelope in connection with the Sebastian interchangeable mileage, and instead will issue a ticket which is made in four coupons. One coupon is the passenger's receipt, the second is his passage ticket, and the third and fourth are stubs. With this device agents can issue tickets in less time than heretofore.

The classification committees of the Trunk Lines and their Western connections have agreed on changes in the classification of about 500 commodities. all of which, except one on cotton goods, produce an increase in the freight rate. Cotton piece-goods now in third class will be advanced to second, and cotton goods in first class will be reduced to second. The most important advances are in sugar, C. L., and coffee and soap, both C. L. and L. C. L. Complaints have been made to the Interstate Commerce Commission, objecting to some of the increases in rates, and a hearing on the subject will be held at Washington Dec. 21.